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# Contractors and Engineers Monthly

Vol. 43, No. 11

NOVEMBER, 1946

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## Covering the Field

### • Dam Construction

This year's work at Cascade Dam, Idaho, included excavating the spillway and drilling a 12-foot diversion tunnel. See page 1. Building an access road and clearing 125 acres marked a start on the Roanoke River flood-control project, Va. See page 59.

### • Grade Separations

The reinforced-concrete arch bridge which now carries Wilbur Cross Parkway over Westfield road is described on this page.

The concrete overpass job reported on page 72 is part of a state-planned series to replace dangerous railroad crossings.

### • Cement-Stabilized Base

The steps in road-mixing native soil, cement, and water for the sub-base of a re-designed highway are told on this page.

### • Rock Breakwater

Page 2 features the surveying system and self-unloading barge used in building a rock breakwater inside San Francisco Bay.

### • Highway Patching

State forces replaced cracking pavement on a 7-mile stretch of road with concrete patches laid on a gravel base (page 6).

### • Airport Construction

Drainage problems faced the contractor who built a \$230,000 North Dakota municipal airport for the CAA. See page 9.

### • County Road Work

An auxiliary crusher at a rock quarry steps up aggregate output. See page 15. Part of the historic Great Southwest Trail is maintained in the county highway system covered on page 66.

### • Highway Grading

The contractor had to spread equipment thin and work it at capacity to whip shortages on the job described on page 17.

Page 35 reports one of four grading and drainage contracts recently completed on the Washington-Baltimore Parkway.

### • Materials Testing

Read page 22 to learn how a state laboratory tests the materials used in constructing and maintaining its highways.

### • Soil Conservation

How the Ulua River in Honduras has been made to rebuild thousands of acres it formerly ravaged is told on page 29.

### • Snow Removal

A county swears by rock salt and truck-mounted spreaders. See page 33. How a snowy state conserves equipment and effort appears on page 63.

### • Bituminous Paving

In New Hampshire, plant-mix was used to cover a 20-year-old concrete slab and a gravel widening strip (page 41). Special tools prepared narrow widening trenches for hot-mix. See page 76.

### • Concrete Paving

See page 47 for an account of grading, aggregate production, and paving on a 10-mile 90-working-day contract. (You will find "In This Issue" on page 4)

## River Diversion Begun at Cascade

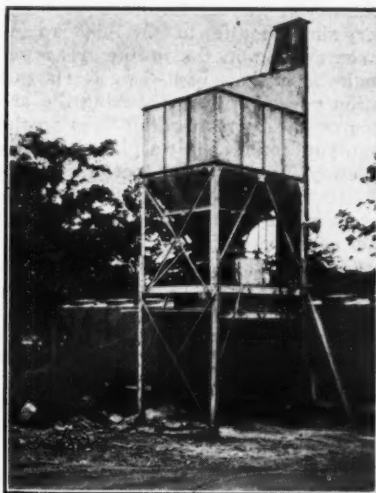
Driving 12-Foot Outlet Through Granite Rock Under Spillway Is This Year's Hardest Job at Dam Site

† CASCADE Dam, a 386,000-cubic-yard rolled-earth barrier across the north fork of the Payette River near Cascade, Idaho, is now under construction by Morrison-Knudsen Co., Inc., of Boise. The company's low bid of \$1,393,889 includes construction of the dam, outlet tunnel, and spillway, and the relocation of a railroad.

Construction is being directed by the Central Snake River District of the U. S. Bureau of Reclamation. The dam will stand 80 feet high above the stream bed when it is finished. It will have a crest length of 800 feet, with a storage capacity of 700,000 acre-feet. From its reservoir will come irrigation water for 25,000 acres of land near New Plymouth and Middleton, and a supplemental supply for 85,000 acres in Emmett Valley, which suffers periodic shortages. About 7,000 acres of the irrigable land which Cascade Reservoir will serve will be open to homestead entry, but no applications will be taken by the Bureau of Reclamation for about two years. Water will be available then.

The dam is the biggest thing that ever happened to the little Idaho town of Cascade. When Project Superintendent Gus Oberg, who has charge of the work for the contractor, moved the vanguard of a 250-man peak construction force in, he found that the town was ready, in a way, for the workmen. There was no room for the men to sleep, but fourteen new bars with gambling rooms and slot machines had mushroomed. Restaurant prices soared overnight.

M-K has thus been forced to build housing facilities for the dam builders. (Continued on page 74)



C. & E. M. Photo  
Batch trucks stopped at this Butler 300-barrel bin, on their way to the paver, to get cement for an overpass on the Wilbur Cross Parkway.

## Rigid-Frame Arch Built for Parkway

Contract Also Includes Large Twin-Box Culvert And Bridge Over Single Track; Job Batch Plant

† PROGRESS on the new section of the Wilbur Cross Parkway in Connecticut advanced a step this summer; a \$182,125.41 contract was completed by the M. A. Gammino Construction Co. of Providence, R. I. The project was a reinforced-concrete rigid-frame arch bridge to carry the parkway over Westfield Road near Meriden, Conn. (At this point the new parkway, which is being constructed by the Connecticut State Highway Department from New Haven north to Hartford, lies about ½ mile east of U. S. 5.) Also included in this Highway Department contract was the construction of two other rein- (Continued on page 12)



C. & E. M. Photo  
A carpenter and his helper, with a SkillSaw, erect office buildings for Morrison-Knudsen at the site of Cascade Dam in Idaho. Since the little town of Cascade could not accommodate the influx of workers, the contractor built similar structures as barracks for the men. Construction men have to deal with the housing shortage, too.

## Cement Stabilizes Base of New Road

Busy Metropolitan Route Has Landscaped Dividing Island Between 32-Foot Hot-Mix-Paved Roadways

† ONE of the busiest thoroughfares in the Los Angeles metropolitan area is Highway 19. Twenty years ago it passed through orange groves. But more recently, mushrooming city dwellings, a growing industrial empire, and glutted modern traffic have hemmed Highway 19 in. The California Division of Highways therefore redesigned part of this route between Pasadena and Long Beach to bring it up to date.

Griffith Co. of Los Angeles has finished the first unit authorized for construction. It extends 5,700 feet south from the Colorado Boulevard intersection in Pasadena. Its design combines two 32-foot roadways divided by a 28-foot median strip in a 110-foot right-of-way. The new highway consists of 4 inches of native soil stabilized in place by cement, 4 inches of plant-mixed cement and aggregate, and 4 inches of plant-mixed asphaltic concrete.

### Traffic Diversion

The present heavy traffic posed the first headache. How could this flow of automobiles be handled and the job expedited at the same time?

Griffith Co. routed traffic through the existing street while grading proceeded on both sides. That street, which lay within the general limits of the future dividing island, was ripped up later, after both new traffic strips were finished. Fast-flowing traffic was handled through the job in this way, but even so it was somewhat of an impediment to trucks hauling plant-mixed material in to the spreader.

Grading consisted only of stripping generally level topsoil from the shoulders of the old road, using Caterpillar tractors with LeTourneau Carryalls for short hauls and a 1¼-cubic-yard Trackson high-lift loader and trucks for longer hauls. This dirt was stockpiled for later use in the landscaped dividing island. Both concrete curbs along the outlines of the dividing strip were started about 500 feet behind finished grading.

### Cement Sub-Base Stabilization

When the true cross section had been established by grading, the east traffic strip was scarified 4 inches deep by a Caterpillar No. 12 grader. Native soil in the 32-foot strip was scraped in two windrows by a Caterpillar No. 12 motor grader. Early in the job this material was shaped in four windrows for a smaller road-mixing machine, but the scheme was not as successful. The two large windrows, each containing about 5 1/6 cubic feet per linear foot, were used through most of the job.

Colton portland cement in cloth bags (Continued on page 83)



# Big Rock Breakwater To Halt Harbor Silting

**Navy Sponsors 8,300-Foot Job by Contract to Retard Silting in Alameda Harbor; Some Job Innovations**

By **RAYMOND P. DAY**,  
Western Field Editor

FOR many years the harbor at Alameda Air Station near Oakland, Calif., has been a catch basin for Sacramento River silt. The bill for maintenance dredging has been excessive. So Navy Public Works officers, faced with the urgent necessity of keeping open two 1,000-foot piers, a seadrome, and small-boat anchorage, finally recommended construction of an 8,300-foot rock breakwater inside San Francisco Bay. Basalt Rock Co. of Napa, Calif., recently finished this \$1,300,000 contract on schedule.

A number of radical new departures from contemporary breakwater procedure were developed on this job. Perhaps chief among them was a self-unloading, shallow-draft, conveyor dump barge for building breakwater core at or near the water surface. It was developed some years ago by A. G. Streb-low, President of Basalt Rock Co., but was improved on the Alameda job. Another innovation which paid dividends was a surveying system, developed by Soren C. Christensen, Chief Construction Engineer. Modeled along navigation theory, this system was responsible for the extremely accurate work more than a mile offshore, and will be detailed later.

The new breakwater, rising 12 feet above mean low water, consists of 486,580 tons of core rock, 284,980 tons of face rock, and 28,270 tons of select cap rock. Other principal items were the dredging of 146,775 cubic yards of mud and silt along the breakwater axis, and the installation of an electrical system of beacon and obstruction lights, communications, and a seadrome control tower. Several 4-pile instrument platforms were also driven, but "Chris" Christensen knew they would work loose in the mud and become floating hazards to seaplanes on the estuary. He abandoned conventional methods of surveying and developed (or invented) a system of his own.

## Improved Survey Control

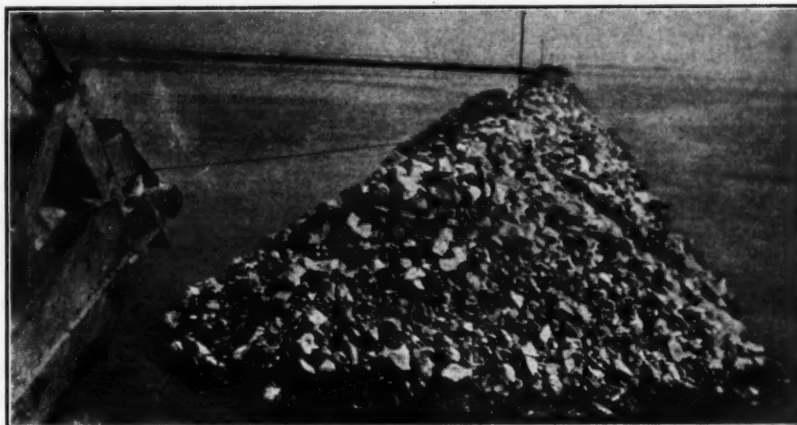
Several survey triangulation stations were carefully located on shore around the job, and all were placed so they could be readily seen anywhere along the breakwater. They were located to third-order triangulation accuracy, and spotted with their coordinates on the big control tracing in the Navy Public Works Office—the map showing the breakwater alignment and location.

A series of arcs, 15 minutes apart, was

then drawn from each control station, and the degrees marked on the map. In scribing these arcs the triangulation station was used as the radius point, and arcs were made until the lines covered the breakwater and were in the clear on the other side.

Forgetting about the maze of curved lines for a moment, you could then look at the breakwater structure and pick out intersecting arcs just about anywhere you wanted to locate. It was a very simple matter to take this map and a sextant out in the harbor, read two angles from these well-flagged triangulation points, and by checking the angles on the corresponding lines on the map you could see at a glance exactly where you were, to the foot. In writing of this we are saying "you" advisedly, because the system is excellent and there are those of you who will want to use it. The trick in accurate locations is to pick out a pair of intersecting lines which cross at right angles or nearly so.

With this system, modeled on navigation theory, no costly surveying or elaborate tagline work was necessary. The Navy as well as the contractor saved money all because Mr. Christensen had done some navigating long ago, before he went to work as an engineer



Core rock dumped from a conveyor-barge boom assumed natural slopes according to the breakwater plans. Excellent alignment was secured, though the work was more than a mile offshore, by a novel surveying system modeled on navigation theory.

for the Navy.

## Probing and Preliminary Dredging

Test holes were sunk on 100-foot centers to locate a sand-clay stratum solid enough to take the breakwater's weight. A 6-inch steel spud and a 3,200-pound drop hammer were used for the probing, which disclosed a layer of soft mud and silt along the breakwater line.

This mud was moved out by dredging with hydraulic pipe-line and clamshell dredges. Dredging was done jointly by the American Dredging Co., the Case-American Dredging Co., and the Olympian Dredging Co. A pile driver owned by Howard Louritzen arrived on the



When dump barges could no longer dispose of their material near the water surface, conveyor barges unloaded core rock for a breakwater inside San Francisco Bay. The contractor on this project to halt silting in the harbor at the Alameda Air Station was the Basalt Rock Co.

job June 25, 1945, and drove the trestle-work for the dredge discharge line. The mud from the breakwater location was deposited along the Alameda shore, and it was necessary to submerge a section of pipe line 400 feet long to maintain a navigable channel into the air station.

A flotation channel 100 feet wide on both sides of the breakwater axis was dredged to elevation 88, which is 12 feet below mean low lower water. When this flotation channel was established, a second sweep 50 feet on each side of the axis was made to dig out for the breakwater wall toe, though this dis-

this control barge was moved, it was rechecked with a sextant and spotted exactly on the right position. One picture of the excellent alignment of core rock is better than a dozen words.

Core rock consisted principally of basalt and feldspar. Specifications for core rock called for well graded, durable rock in pieces from 27 cubic inches ( $2\frac{1}{2}$  pounds) to 8 cubic feet (1,200 pounds). This core rock was designed to form the main bulk of the structure, with side slopes of  $1\frac{1}{4}$  to 1 and  $1\frac{1}{2}$  to 1, and widths at the top from 3 feet  $9\frac{1}{2}$  inches to 7 feet.

The introduction of conveyor barges solved the particularly knotty materials-handling problem on core rock from the point where dump barges could no longer dispose of their material. It proved economical in the handling of large quantities of core rock. Constructed on steel hulls, the conveyor barges were equipped with 36-inch rubber conveyor belts in the bottom of the V-shaped hopper section. The conveyor belts were driven by a 75-hp G-E motor on each barge.

While the barge was being loaded at the quarry, the conveyor belt was covered by removable timber doors, or hatches, to prevent injury to the rubber belt. While the barge was being unloaded, these doors were pulled with the aid of a 5-hp electric-motor-driven hoist, mounted on a traveling beam. The beam rolled on wheels which were supported on the barge coaming.

All electric power for the motors was secured from the control barge, which had a Caterpillar D8800 diesel engine driving a 50-kw Louis-Allis generator. When the conveyor barge completed its 14-mile tow from the quarry, it was lashed to the control barge and the electrical connection made fast. The first two doors were pulled open, and the conveyor belt carried all core rock up an incline at the end of the barge, to the end of a boom approximately 25 feet long. The rock thus dumped assumed a natural slope according to the breakwater plans.

About 8,000 tons of rock was unloaded in 2 hours with these two conveyor barges, without hurrying. Once it was done in 38 minutes, but the men admit they were hurrying that time. The crew for the conveyor barges consisted of Tony Frietas, Foreman; Bill Martin, Operator; and five bargemen, all of whom were stationed aboard the control barge. One conveyor barge was usually unloaded while the other was en route to or from the quarry.

Four tugboats and one motorboat were continually in use towing between McNear and Napa Quarries and the breakwater.

## Placing Face and Cap Rock

The placing of face rock on the inward and seaward slopes of the massive breakwater was a much slower, more tedious process. The plans called for a layer of facing rock 5 feet thick on the

(Continued on page 55)



This view of a conveyor barge shows the timber hatch covers which protected the rubber conveyor during loading. A 5-hp electric-motor-driven hoist mounted on a traveling beam moving along the barge coaming helped to remove them.



# Virginia paves 42 miles of Route 10

using Texaco Asphalt and pit-run aggregate

Constructing a Plant-mixed Texaco Asphalt pavement on 42 miles of old bituminous-treated gravel on Route 10, Virginia.



Old, bituminous-treated gravel surface at the left and first course of new Texaco Asphalt pavement on the right.



Completed first course of Texaco Asphalt pavement. Contractors: American Asphalt Products Corporation, Washington, D. C. and Sam Finley, Inc., Atlanta, Ga.

Traffic outgrew the bituminous-treated gravel surface on 42 miles of Route 10, between Hopewell and Smithfield, Va. But, while no longer adequate as a wearing surface, the old road did possess one important advantage. Well-consolidated by years of service, it provided an excellent base for a new pavement.

Virginia is solving this problem in a way which is both effective and economical. It is resurfacing the old road with a Texaco Asphalt pavement of the Plant-mix type, using inexpensive pit-run aggregate and an 85-100 penetration Texaco Asphalt. The pavement is being laid in two courses, having a combined thickness of 2½-inches.

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# Contractors and Engineers Monthly

THE NATIONAL BUSINESS PAPER FOR CIVIL ENGINEERING  
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## By Their Signs

Despite the limited amount of maintenance work on the country's highway system through the war years, the roads were found to be in not too bad condition on the whole during this first complete season of unrestricted travel since 1941. Tourists and travelers have driven over many poor and broken-down roads badly in need of repairs, it is true. But highway departments have been correcting that situation as fast as money, materials, and manpower have been made available for the work. One special gripe, however, that the traveling public is registering, and about which nothing much substantial has been done, is the inadequacy of highway signs and directional markers.

In many cases these signs, installed during the horse and buggy days, lag far behind the engineering and construction advances built into our newer, higher-speed highways. And even when replaced, directional markers are often merely duplicated in a style long ago outmoded. This is particularly true of those signs placed parallel with the road which, even if the motorist does see them, afford only a blur of names to the corner of his eye as he flashes past. Should he stop for a closer inspection, he holds up traffic and sets horns to honking—if someone hasn't already smashed into him from the rear.

Most signs are too small to read at the legal driving limit, which has now generally exceeded pre-war levels. Before he realizes it, the motorist has passed his turn and is on the wrong road. Another cause of vexation is the Christmas-tree signpost, cluttered up with a multitude of signs pointing in all directions of the compass and only adding to the bewilderment of the out-of-town tourist. The fact that the arrows on some of these markers are not too well outlined either requires the driver to give them close scrutiny with his bifocals at the risk of colliding with the oncoming car or running into the ditch. Then there is the road intersection with no sign at all, which leaves the man at the wheel in a complete state of helpless confusion as he tosses a coin to decide which turn to take.

These violations of the motorist's safety and comfort are by no means confined to the back roads of the country. Some of the most flagrant transgressions can often be found on the main arteries of travel—the parkways, skyways, throughways, freeways—and on all the other super-duper, high-powered, high-speed roads with their cloverleaf and pretzel interchanges which, if not clearly marked in LARGE letters, can become a motorist's nightmare.

When some people travel they are guided solely by route numbers. Others plot their course by looking for place names. One group relies on maps for directions. And there are also the op-

timists who seek out local intelligence when looking for travel information. These last can be left to their fate, but the others deserve better cooperation than they get from many highway departments. A big help would be to post route numbers and the names of important places en route where they can be easily seen both by day and by night, without requiring the operator to lessen speed so much that he impedes traffic or risks a collision.

On trips into unfamiliar territory, the motorist often may know he is on route empty-six. But he may have not the vaguest idea at just what point on that numbered highway he is rolling along. Here is where town, village, or city identifying markers posted at the municipal limits would be of assistance. Altogether too many communities leave the driver to guess their names or else spot them inscribed on the local bank or post office as he weaves his way through the narrow lanes of traffic.

A few states help greatly by including the mileage to the next place name on a sign, along with the name of the town or city being approached. Tourists would likewise appreciate a board of mileage directions outside of towns, with the name of the next big city also listed even if it is 100 or 200 miles away.

Highway marking which calls the motorists' attention to sharp curves, steep hills, dangerous intersections, etc., has prevented many accidents. Intelligent directional signs which eliminate confusion in the traveler's mind can do the same, for they keep traffic moving smoothly. The traveling public judges a state's highway system by the adequacy of its signs as well as by its pavements. John Q. Public foots the bills for these roads. So why not ease his mind as well as the springs in his car



as he breezes along hoping he is on the right road to Utopia?

Highway departments could take a tip from advertising signs planted along most of our roads. Their huge letters recommend everything under the sun. We cannot avoid seeing them. But the little directional sign and the even smaller arrow, which are of far more general usefulness, are tucked away in a blind spot on the road, concealed all too well. An increased number of larger and better-located signs will add to the convenience and safety of the traveling public and make it aware of the service its highway departments are rendering.

## Road Building—Key To National Economy

Smithville and Jonesburg are building a modern highway to connect these typical American cities. The new road will help business and living conditions in both communities, and will aid the farmer, dairyman, and small merchant along the new route. It will bring driving pleasure to many, and it will promote friendships.

But this road will do more, says Charles M. Upham, Engineer-Director of the American Road Builders' Association, in "Down the Road". The benefits that will accrue from this road make it more than merely a local matter, he claims. Such a highway contributes to the business and living conditions of the entire nation, since every dollar spent in road work creates three dollars' worth of job opportunities in other parts of the country, in addition to the jobs it brings the citizens of Jonesburg and Smithville.

The construction dollar gives work to many industries. Road building keeps money circulating, and thus is a stimulant to business across the nation. "The more roads, the more healthy is our national economy", Mr. Upham says.

Highway construction in the next few years will far exceed any road program previously attempted. Extensive relocating, widening, and resurfacing operations are needed on the primary network and must include a large mileage of divided-lane limited-access highways. The secondary system needs extending, resurfacing, and relocating. Congestion, especially, is going to be a greater factor on the highways of the future, Mr. Upham warns. More and faster cars and heavier trucks make a better type of highway essential, one that will be wider, safer, and more enduring.

A nation-wide survey conducted by the ARBA shows that the country is moving ahead in its program of highway construction, Mr. Upham reports. Despite shortages of material, labor, equipment, steel, and trained personnel, the situation is brighter than generally believed, he asserts. Such bottlenecks as orders to the states to slow up on awarding contracts and the new cutbacks in castings needed for machinery are being eliminated slowly but surely.

However, Mr. Upham warns, neither one year nor several years of road building will solve this country's road needs. Year after year of sustained road building is "an absolute necessity".

Only 49 per cent of the nation's 1,928,000 miles of county and local roads have all-weather surfaces. Only 73 per cent of the 304,000 miles of municipal streets and alleys have surfaces of concrete, asphalt, tar coating, gravel, or stabilized earth. Even in the better-cared-for state-controlled highway systems, 17 per cent of the 563,520 miles still lack such surfacing.

"We need the roads; we must have them; we must build safety into them; but we must have the funds to build them", Mr. Upham says. "An aroused public opinion can do much to get things moving. America has always delivered when the people asked for

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something. Just now the people want roads."

## Medal of Merit Given To Thos. H. MacDonald

Hailing the vision and energetic leadership of Thomas H. MacDonald, President Truman recently awarded the Commissioner of Public Roads the Medal of Merit for his outstanding service during the war.

Presented by Major General Philip B. Fleming, Federal Works Administrator, the award cited Mr. MacDonald for envisioning, even before the war, the importance of highways to military operations. He was lauded for supervising the creation and maintenance of 78,800 miles of strategic highways, mobilizing the nation's highway forces for the war effort, and helping to build the Alaska and Trans-Isthmian Highways.

## Everyday Legal Problems Told in Simple Language

Plain-language summaries of legal decisions which affect contractors are presented in a 175-page volume, "The Contractor's Legal Problems", recently published. Compiled by Norris L. Hayward, the cases cited serve as a guide to the contractor who wishes to avoid legal difficulties. It stresses the importance of regular consultation with an attorney, in order to avoid trouble.

Everyday legal problems, based on actual court decisions, are recounted in 118 brief sections. Carefully avoiding technical language, the narrative treatment makes clear the legal points in question. The book can be obtained from the McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y., for \$2.50.

## New Member of C&EM Staff

CONTRACTORS AND ENGINEERS MONTHLY wishes to announce that Melvin Dean of New York City has joined its staff as New Products Editor, succeeding John P. Flynn. Mr. Dean was recently discharged from the Navy where he served with the Seabees in the Pacific. He was graduated from the Engineering Department of Michigan State College.





# SEAMAN MIXERS

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36  
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**MANY OF THE STATES** shown in the map above own several Seaman Mixers, — some are operating 10 or more units. In other States, construction for the State Highway Commissions is handled by counties or contractors owning Seaman Mixers, — approved by the Commissions. Such a record is pretty powerful evidence that road mixing with the SEAMAN is done faster, more efficiently, and leads to a higher loadbearing, longer-lived pavement. Write to Seaman Motors, Inc., Milwaukee 3, Wisconsin, to find out why.

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## SOIL STABILIZATION METHODS

One of the most popular books in the Soil Stabilization field,—"Soil Stabilization Methods", compiled by Seaman engineers, in the recently published new edition, contains much new information brought forth during the War years. Write for your copy. Ask for Bulletin E-25.





## State Forces Patch Dual Concrete Road

**Old Pavement Shattered And Removed; Truck-Mixed Concrete Used in Repair Of U. S. 40 in Maryland**

✦ A SECTION of U. S. 40, a dual concrete highway linking Baltimore, Md., and Wilmington, Del., was improved this season as a regular maintenance operation of the Maryland State Roads Commission. A 7-mile stretch in Baltimore County, Md., was examined for signs of cracking; in places where such signs were found, the old pavement was removed and replaced with concrete laid on a gravel base. About 60 patches, ranging in length from 15 to 60 feet and all at least 10 feet wide, were made with truck-mixed concrete between the Martin Airport Road and the Harford County line. This dual highway was built in 1937 with two 20-foot concrete pavements having a 9-7-9-inch cross section.

The cracked or deteriorated areas of the pavement to be removed were designated to the Foreman by the Assistant District Engineer in charge of maintenance or the Resident Maintenance Engineer, as the occasion required. The maintenance force performing the work was divided into two gangs. The first removed the old pavement, spread the gravel backfill, set the forms, later removed them after the concrete had been poured, and moved them ahead; the second gang did the concreting. The two crews endeavored to keep their separate operations within 2 or 3 miles of each other. In this way they did not tie up too long a section of road, since both directions of traffic were forced to use the half of the dual highway that was not being repaired at that time. A 30-foot grass parkway separates the two concrete roadways.

### Removing the Old Pavement

The first step in removing a section of the old pavement in preparation for the patch was drilling a row of holes

through the slab following the outline of keel marks. This was done with any of the three jackhammers on the job—a Worthington, Cleveland, or Chicago Pneumatic—powered by either a Worthington 315-cfm or an Ingersoll-Rand 210-cfm air compressor. The holes were made on 3 to 4-inch centers with Timken 2-inch rock bits secured to  $\frac{7}{8}$ -inch hexagonal drill steel 20 inches long. One bit usually lasted for 30 such holes before having to be replaced. If the patch ended at an expansion joint, a bull point was used in the hammer to cut out the bituminous material.

The concrete between the holes was then broken out with four Chicago Pneumatic, a Gardner-Denver, and a Worthington breaking hammer, using a 3-inch spade to make a complete cleavage crack. In this way the area to be patched was isolated from the rest of the pavement, and any damage caused by the pavement breaker that followed would not be transmitted to the areas still in good condition. The breaker used to shatter the concrete consists of an old rig made up of a Mack 1917 hard-rubber-tired truck, at the rear of which is a Universal crane with a steel cylinder, 16 feet long x 6 inches in diameter, weighing 1,900 pounds. By lifting this weight 6 feet in the air and then releasing it so that it dropped by gravity, the crane did an effective job of breaking the concrete into pieces small

(Concluded on next page)

The first step in patching a section of the dual highway U. S. 40 in Maryland was the removal of the worn pavement. 1. Here a Gardner-Denver hammer powered by an I-R 210-cfm compressor breaks out old concrete between drill holes. 2. A Universal crane on a 1917 Mack truck was equipped with a 1,900-pound steel bar to break up the old pavement. 3. The concrete rubble was loaded into 2½-yard Mack trucks by a General ¾-yard shovel. 4. After the subgrade was prepared and from 6 to 8 inches of bank-run gravel placed and compacted, truck-mixed concrete was placed in the area to be patched. Here a Jaeger 6-yard mixer delivers a batch. 5. Finishing was done by a Jaeger-Lakewood equipped with a double screed. 6. After any surface irregularities were removed by a hand finisher with a straight-edge, a 12-inch canvas belt was drawn over the fresh concrete. 7. Eltecure curing compound was sprayed on the concrete patch by a trailer-mounted Aeroll unit. 8. To maintain equipment on the project, a Ford service truck was available. On it were mounted a Dualarc electric welder and an oxyacetylene welding outfit.

C. & E. M. Photos





# Road Patching

(Continued from preceding page)

enough to be easily scooped up with a power shovel.

In this first section the pavement contained no mesh reinforcement, only dowels at the joints, so the excavation progressed smoothly. A General ¾-yard shovel loaded three Mack 2½-yard trucks with the concrete rubble and with the subgrade, which was usually removed to a depth of 6 inches below the concrete. The material was hauled 4 miles to a site on the Joppa Road where permission had been secured from a property owner to waste it on his land. Bank-run gravel was then purchased from a near-by commercial pit for use in backfilling the excavation with from 6 to 8 inches of material. The gravel was dumped and spread by hand, and compacted by a Buffalo-Springfield 6-ton 3-wheel roller over most of the patch.

If the patch hole was too small for the roller to operate efficiently, or where it could not reach at the ends of the patches, the ground was compacted by two Worthington pneumatic tampers. By this careful attention to soil compaction and the use of a good grade of granular material for the base course, a firm consolidated foundation was secured for the concrete patching that followed.

## Truck-Mixed Concrete

When a patch was made on the outside lane, Blaw-Knox steel forms were used. There were 700 feet available to the crew. The concrete was purchased from the commercial plant of Harry T. Campbell Sons Co. of Towson, Md., and delivered to the job site in truck-mixers from its plant on U. S. 40, only 4 miles south of the center of the project. Three mixers were used—a 6-yard Rex powered by a Waukesha engine and mounted on a Fruehauf trailer with a White truck; a 6-yard Jaeger powered by a Hercules engine with the same trailer and truck assembly; and a Smith 4½-yard mixer on a Mack truck. Water was added to the mixers only when the job was reached, and the batch was then mixed for 20 minutes before being chuted into place.

No reinforcing was put in the paving patches, and finishing was done with a Jaeger-Lakewood finishing machine equipped with a double screed. Behind the machine any surface irregularities were removed by a hand finisher with a Heltzel 10-foot steel long-handled straight-edge. After this, a 12-inch canvas belt attached to a bowed wooden frame with a plow handle at each end was drawn over the fresh pour. The finishers then edged the outside of the patches with a ½-inch-radius tool and the concrete was ready for the membrane cure. Ritecure was sprayed on the surface by an Aeroil unit mounted on a 2-wheel rubber-tired trailer which was pulled around by a Ford 1½-ton service truck. After five days, traffic was permitted over the patches.

The 7½-bag batch of concrete used in the patching produced a cubic yard of concrete with these dry weights:

Cement	705 lbs.
Sand	1,143 lbs.
Stone	900 lbs.
Gravel	1,031 lbs.

To this mix was added 37½ gallons of water. The gradation of the sand and the combined coarse aggregate was:

Sieve Size	Per Cent Passing
	Sand Stone and Gravel
2½-inch	100.0
2-inch	98.2
1½-inch	78.7
1-inch	55.9
¾-inch	24.6
No. 4	100.0
No. 8	97.3
No. 16	82.6
No. 30	71.7
No. 50	56.2
No. 100	17.7
	2.3

Concrete pouring started on May 8.

The usual procedure was to pour three days a week with the alternate days devoted to preparing the subgrade and setting forms. From 70 to 80 yards of concrete usually comprised an 8-hour-day pour.

## Maintenance Force

The maintenance force was a combination of white maintenance workers from the regular payroll, and colored convicts from the Maryland penitentiary in Baltimore. The regular employees, who numbered about 14, operated the equipment, set the forms, and did the finishing; the prisoners, 16 in number, did most of the hand labor, and also operated the pneumatic tools used in breaking up the old concrete.

For maintenance of equipment the crew had a Ford service truck on which was mounted a Dualarc 200-amp electric welder with a Star generator and driven by a Continental engine, and also an oxyacetylene welding unit.

When the section in Baltimore County is finished, the maintenance crew

will continue the concrete patching east on U. S. 40 into Harford County. The section of this road to the west, between the eastern limits of Baltimore City and Martins Boulevard, State Route 700, will be improved by contract. The plan is to patch the present road and widen it from 20 feet to 24 feet. Then, using the present pavement as a base, the contractor will lay a surface course, reinforced with mesh, a minimum depth of 5 inches, of air-entrained concrete.

## Personnel

The Maryland State Roads Commission's engineering force which supervises such projects is headed by Wilson T. Ballard, Chief Engineer; Frank P. Scrivener, Maintenance Engineer; and Thomas Linthicum, Acting Construction Engineer. The improvement on U. S. 40 lies within District 4, which is headed by D. P. Campbell, District Engineer with headquarters at Towson, Md.; James N. Heile, Construction Assistant District Engineer; and E. C. Chaney, Maintenance Assistant District



"Remember the good old leisurely pre-war days when a fellow could supervise a job in a 120-horsepower automobile?"

Engineer. These are assisted by M. C. Volker, Resident Maintenance Engineer in charge of Baltimore County, and P. B. Shipley, Resident Maintenance Engineer in charge of Harford County. The supervision in the field is exercised by Edmond Durner and Samuel Wesley.

*Servicised:*

**Premolded KORK-PAK Fiber**

**- EXPANSION JOINT -**

*Watertight, Nonextruding, Resilient*

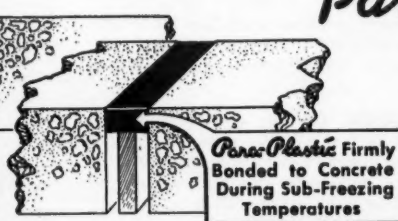
**KORK-PAK** is the general purpose Premolded Expansion Joint Filler used in many places in preference to the ordinary fiber joint and to decidedly better advantage. The outstanding features are—it handles better, without breakage during shipping and installation, it is more rigid for all dowel bar assemblies, more resilient and has far less absorption, consequently more economical for use on all types of work. Every engineer today knows that the first requisites to consider in a good Expansion Joint are Resilience, Non-extrusion, Non-absorption and permanence. All these advantages are obtained at relatively low cost, by the use of Kork-Pak.



Para-Plastic being poured into expansion joints for foundation of concrete pool.



Para-Plastic  
HOT-POURED  
RUBBER SEAL  
Concrete Slab at  
Normal Temperature



Para-Plastic Firmly  
Bonded to Concrete  
During Sub-Freezing  
Temperatures

*Para-Plastic*

**The Positive  
And Permanent  
Expansion Joint  
Seal**

Para-Plastic is a hot-poured material that forms a rubbery, resilient, adhesive and cohesive plastic. Para-Plastic is poured as a top seal in conjunction with the non-extruding premolded KORK-PAK fiber expansion joint filler. This combination is the positive and permanent method to secure a waterproofed joint.

Para-Plastic bonds firmly with any form of construction—and maintains a perfect seal during sub-zero temperatures. Para-Plastic is the positive seal all year around against the infiltration of water or any other substance. Specified for general construction for many years by leading engineers throughout the country.

Send for Additional Data And Information on the KORK-PAK Expansion Joint Filler And PARA-PLASTIC Seal.



**SERVICISED PRODUCTS CORP.**  
6051 West 65th Street, Chicago 38, Ill.



### Calcium Chloride Assn. Moves to Washington

The Calcium Chloride Association has transferred its activities from Detroit to Washington 6, D. C., where it has established headquarters in the LaSalle Building at 1028 Connecticut Ave., N. W. George H. Kimber is Managing Director of the Association.

Facilities for engineering and technical reference in the fields in which calcium chloride is used are better in Washington, the group believes. Organized in 1933, the Association comprises the Dow Chemical Co., Pitts-

burgh Plate Glass Co., Solvay Sales Corp., and the Wyandotte Chemicals Corp.

In addition to its research activities, the body distributes information on the uses of calcium chloride in road stabilization, concrete construction, dust-proofing, and other fields.

### Joins Joyce-Cridland

H. H. Landis has been appointed Manager of the Eastern Division of the Joyce-Cridland Co., maker of jacks and lifts. He will be located at the firm's home offices in Dayton, Ohio.

### Johnson Acquires Case

William A. Johnson has acquired the interest of his former associate, Vern D. Case, in the Case Construction Co. The name of this west-coast contracting firm has been changed to the Johnson Western Co. The Case American Construction Co., engaged in dredging, will be called Johnson Western American.

Elden Smith has joined the firm as its President. Harry Gast remains General Manager and assumes the duties of Vice President. Eldred Northup continues as Operations Manager, and the Los Angeles, San Francisco, and San

Diego divisions will remain under the supervision of L. J. Sullivan, D. W. Shupp, and E. E. Jackson, respectively.

### Lifting Equipment

Shop superintendents will be interested in a line of lifting and pulling equipment featured by the Coffing Hoist Co. in a recent bulletin. It lists Safety-Pull ratchet lever hoists, Quik-Lift electric models, chain hoists, load binders, trolleys, and other accessories. Copies of Form 4 can be secured by writing Coffing at 800 Walter St., Danville, Ill. Mention this item.

# YOU'LL MOVE MORE YARDAGE WITH "CATERPILLAR" SCRAPERS



**HERE** are facts—proved on the job—that show why the new "Caterpillar" Scrapers move more earth—faster—at lower cost.

**BOILING ACTION.** The design of the bowl and blade-edge boil earth upward through the middle instead of forcing it up and over the sides before the middle is full. That's why "Caterpillar" Scrapers load easier, top out better. This feature means more yards per hour. The blade cuts faster and easier on hard ground and contributes to central boiling action in the bowl.

**SPREADING.** The big apron opening is another feature of "Caterpillar" design. It gives positive, clean ejection. Results in faster unloading—no hanging up or sticking—and more trips per hour.

**OVERSIZE TIRES.** Scrapers pull easier on bigger tires. "Caterpillar" recognizes this and equips its scrapers with oversize tires. On soft ground, off the road, the larger tires permit lower inflation, more tread area to absorb the weight, better flotation and higher hauling speeds. That means easier hauling, increased yardage and lower costs—plus extra tire life.

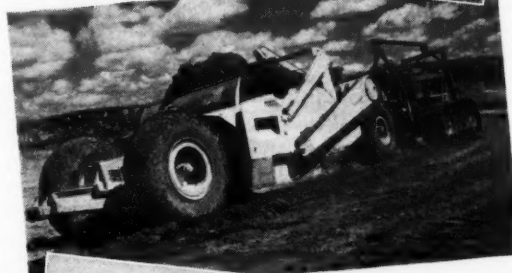
**STRONG CONSTRUCTION.** Rugged design, superior materials and expert workmanship increase durability. These scrapers are built to last. They have welded construction and high-tensile steels throughout. Rugged-rib bracing of the heavy double-bottom plate is provided for increased strength and wear.

**NEW "CATERPILLAR" CABLE CONTROL.** Sure-acting and fast. Matched to the load. Oversize machined and heat-treated sheaves and correct reeving give longer cable life.

**OPEN BOWL.** "Caterpillar" design achieves maximum strength without the drawbacks of an overhead frame. The operator has good visibility for loading and spreading, and the scrapers can be shovel-loaded, an important feature on many jobs.

Factory production of the new "Caterpillar" Scrapers and Bulldozers is steadily increasing. See your "Caterpillar" dealer now—find out the advantages of a full line of matched earthmoving equipment—and get your order in early.

CATERPILLAR TRACTOR CO., PEORIA, ILL.



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ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT



## New Airport Poses Drainage Problem

### Glacial Rocks Under New Airport Runways Make Ditching a Slow Process; Gravel Production

THE distinction of being one of the toughest little drainage jobs of the year goes to North Dakota's Valley City Municipal Airport. The new \$230,000 terminal is being built in glaciated soil under a contract with Megarry Brothers of St. Cloud, Minn. It is being built under a Civil Aeronautics Administration contract, and will serve and encourage civilian flying.

The extensive drainage system was necessary to make all-weather landings possible on three graded earth strips. It called for trenching machinery, dynamite, and hand labor. So far as problem drainage is concerned, this was one of the most discouraging jobs any contractor faced this construction season.

When work began on April 24 this year, the land within the airport limits was generally soggy. All of it once lay under the Wisconsin till, and is composed of interglacial clay, fine silt, and glacial boulders. The new field was designed for a main NW-SE runway 3,800 x 100 feet, paved with 4½ inches of plant-mixed asphaltic concrete laid on an 11-inch gravel base. Graded runways for the terminal included a N-S strip 4,200 feet long; a NE-SW strip 3,500 feet long; and an E-W strip 4,000 feet long. The airstrips were designed to have graded slopes of 1½ per cent, and the airport property lay generally on a low ridge of ground. On the face of things it seemed like naturally good drainage.

#### Trouble With Mud

But when five Caterpillar D8 tractors with a LeTourneau Carryall on each machine were moved in to start the grading, they began to bog down in clay pockets. The job called for about 20,000 linear feet of pervious concrete-pipe drains, with some drainage ditches along the edges of the runways. It seemed best to establish these drains as quickly as possible. One long ditch was dug out by Carryalls. But when the machines mired in, it was necessary to use a "snatch cat" ahead of the prime mover, with a D8 pusher behind the Carryall.

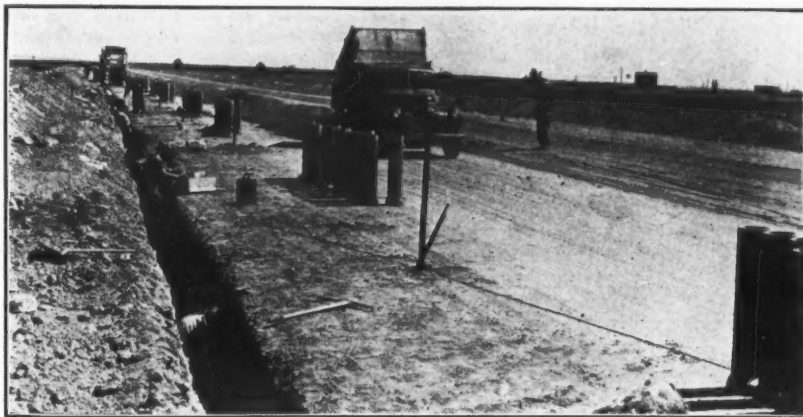
A ¾-cubic-yard P&H dragline was brought in to dig some drainage ditches. It was necessary not only to set this dragline on timber pads, but to haul in gravel to give them sufficient footing.

Preliminary work on the open drainage ditches let much of the surface water flow off, and the airport dried up enough so the grading equipment could work efficiently. One of three Woolridge Terra-Cobras which Megarry Brothers own was brought in to do long-haul work. Carryall hauls were held down to 1,000 feet.

#### Trench Excavation

On the sides of the main paved strip, CAA plans called for a number of deep trenches from 4 to 7 feet deep, with concrete pipe in from 6 to 36-inch sizes and selected-gravel backfill. The excavation of these deep trenches was probably the most difficult operation on the whole project.

A Parsons Model 25 trencher was brought in and set to work on a string-lined course. In ordinary digging this machine accounts for 1,400 linear feet of 8-foot trench in 8 hours. At Valley City Airport the machine had not graded the bottom of its first 50 feet before the steel teeth on its endless bucket chain were ripping into glacial bould-



C. & E. M. Photo

Before installing pipe in a drainage ditch along the main runway of Valley City Municipal Airport, N. Dak., men remove glacial boulders. In the background is the Parsons trencher. The truck at right is dumping a granular blanket on the runway.

ders. So Megarry Brothers ordered dynamite. It was the only thing to do.

#### Glacial Boulders Blasted, Rooted

Single sticks, half sticks, and quarter

sticks were doled, put in crevices and under boulders. A few 3-foot rocks had to be drilled with a jackhammer and loaded from inside. Rock was loosened and broken up any way that explosives

could do the job.

When the "all-clear" signal was given, the Parsons trencher moved back in and resumed its tearing away at the tough formation. Loose rock in pieces up to 250 pounds was removed from the ditch by hand labor. Large rocks were lifted out by a utility truck equipped with a cable-controlled winch. But even with this concentration of men, machines, and explosives, the rate of excavation was only about 50 feet an hour. The trenching machine found about 700 feet in one stretch free of boulders. It galloped through that section in only 4½ hours.

While the trenching crew was having this difficulty, the Carryalls were running into similar material. A single-tooth Rooter was used behind a Caterpillar D8 tractor wherever the boulder nests were heavy. Use of this LeTourneau Rooter boosted Carryall performance in rock by as much as 25 per cent. By this time the drainage ditches had started to function, and the scraper

(Concluded on next page)

**MORE MOUNTINGS  
TO CHOOSE FROM!**

**NEW**

**LORAIN TL-20**

offers you a choice of..

The TL-20 offers you any measure of mobility your job dictates. Two-engine Moto-Cranes (33 M.P.H.) or single-engine self-propelled mountings (8 M.P.H.), both in 4 and 6 wheel types with or without front wheel drive.

Here are 9 different combinations to choose from. Every one proved both on the road and on the job. All are the product of the pioneer (and largest) manufacturer of rubber-tire mounted shovels and cranes.

**1**

**9 RUBBER-TIRE  
MOUNTINGS**

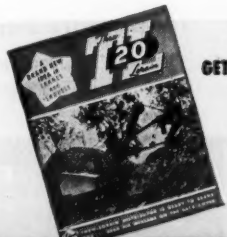


**2**

**OR A MODERN 2-SPEED CRAWLER**



If the job dictates crawlers, the TL-20 is readily available with 2-Speed Chain Drive Crawler. It travels 1 or 2 M.P.H. in both directions; offers such modern features as "full circle" steering, unit construction, a fully enclosed propelling mechanism running in oil and tread and travel lock.



GET THE COMPLETE TL-20 STORY!

We repeat—the TL-20 is truly a new postwar shovel and crane in the 1½-ton class, not a re-bash of wartime design and thinking. Ask your local Thew-Lorain distributor for copy of bulletin. It lays the facts on the line—and you'll like 'em!



**THE  
THEW SHOVEL CO.**  
LORAIN, OHIO

**Available with 5 Interchangeable Booms and Choice of 10 Mountings**





C. & E. M. Photo  
This grizzly unit, fed by a Caterpillar tractor with a LaPlant-Choate bulldozer, produced granular base-course material for the Megarry Brothers contract to build the Valley City Airport in North Dakota. Rock over 3 inches was wasted off the end of the grizzly to the scrap pile.

## New Airport

(Continued from preceding page)

prime movers were able to dispense with the snatch tractors.

Pervious concrete-pipe drains which carried this ground water away so successfully were laid with open bell-and-spigot joints. They all led towards a 36-inch outfall which drained off at the low end of the airport property line.

### Select-Gravel Production

Select pervious material and aggregate for plant-mix were designed around native gravel in near-by washes. The specifications for select gravel in the drainage ditches were more exacting than for the 11-inch pervious blanket under the runway paving, which called only for well graded material from 3-inch to No. 200. Megarry Brothers set up a portable Cedarapids aggregate plant, fed by a Bucyrus-Erie 10-B dragline, in order to produce the select gravel.

Material for the granular base course was produced about ½ mile from the center of the job. It was handled from the pit by a Caterpillar D7 tractor and a LaPlant-Choate hydraulic bulldozer. This machine fed a wood hopper tapped by a single gate. A 24-inch Pioneer belt conveyor 30 feet long, driven by an International P-12 gasoline power unit, carried material up to a 4 x 8-foot sloping grizzly with steel bars set for 3 inches of clearance. The hopper was fed by a Caterpillar tractor.

A fleet of fifteen Ford, Chevrolet, and GMC trucks was used under the sloping grizzly to haul screened material out to the airfield. Each received a load from this small portable plant in about 1½ minutes. Rocks over 3 inches in size wasted off the end of the grizzly, and when an accumulation had built up to the screen the bulldozer pushed them down the wash. When it was impossible, for one reason or another, for a truck to dump gravel in a drainage ditch, the better grade was used in the subgrade blanket rather than have a truck wait.

Compaction requirements for granular backfill were based on the modified Proctor method of soil mechanics, and called for at least 95 per cent of the optimum density based on laboratory methods. A laboratory was maintained on the job by the CAA, and all density tests were run there.

By mid-July, when the airport was visited for CONTRACTORS AND ENGINEERS MONTHLY, the completed system of drains and gravel blanket had already been of immense value in completing the heavy grading. Heavy equipment was operating on top of the ground rather than axle-deep in mud. Moisture was definitely on the move from the dense subsoil. The men in charge of the job felt that they had whipped an acute drainage problem equal to anything they might have found on a much larger airport.

### Paving

A Madsen portable asphalt plant was

pavement on the main runway was laid in two courses by a Barber-Greene bituminous finisher.

### Personnel

N. J. Ferrario was Megarry Brothers' Project Superintendent. The Valley City Airport is one of several which have been built in Minnesota and North Dakota by the Civil Aeronautics Administration. This project was under the direction of Regional Administrator George W. Vest. John A. Timmons was Project Engineer, assisted by Frank Peters. The CAA Plant and Structures Branch supervisory and inspection force, including surveyors, numbered twelve men.

As a service to our readers, we'll be glad to see that you receive new catalogs and bulletins which are reviewed in this issue. Just let us know which ones you are interested in and we'll do the rest.

## Air-Powered Winch Is Portable and Versatile

A handy small hoist, the Air-Winch, has been announced by the Sullivan Division of the Joy Mfg. Co. Powered by air, the unit has a lifting capacity of 500 pounds; it weighs 85 pounds.

One man can move the Air-Winch, mounting it in any position on car, timber, column, or bar, Sullivan says. Power is supplied the unit by a 4-cylinder reversible piston-type air motor. Positive, sensitive control is possible on the drum, it is claimed. The unit has a capacity of 150 feet of ¼-inch rope. A brake lever is conveniently placed to prevent the drum from spinning, the manufacturer points out.

The AW-80 Air-Winch is adaptable to hoisting, dragging, hauling, pulling, and similar duties, Sullivan says. Write the firm at the H. W. Oliver Building, Pittsburgh, Pa., for Bulletin No. 76-H, and mention this notice.

Provide longer wear and lower costs in the operation of all makes of excavating and mining equipment. Made to fit—of improved, reinforced design and construction—wear-resisting toughened steel. Years of experience assure you wearing parts that provide long service, lasting satisfaction and greater economy. Submit list of your equipment for further details, without obligation.

Manufacturers of: PACIFIC MANGANESE STEEL RENEWABLE TRACTOR RIM SPROCKETS AND IDLER WHEEL RIMS—PACIFIC CRAWLER PADS AND OTHER WEARING PARTS—PACIFIC SHEAVE BLOCKS—PACIFIC ROCK BIT GRINDER—Other PACIFIC MINING AND CONSTRUCTION EQUIPMENT.

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Presto Tire Demounters easily remove the most difficult types of tires for trucks, buses, earthmoving equipment and other heavy vehicles. No injury to tire, tube, wheel or rim. Adjustable for all size tires.

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A new camera-transit for use in terrestrial photogrammetry has been announced by the Fairchild Camera & Instrument Corp.

### New Camera Transit Aids Photomapping

What is believed by its manufacturer to be the first American-made camera transit is now being produced by the Fairchild Camera & Instrument Corp. The instrument, a combination of a specially designed camera and a surveyor's transit, was developed by Fairchild in cooperation with J. E. King of the U. S. Forestry Service.

Making maps from photographs has been possible for some time. But the European instruments used in this work are highly complicated and do not lend themselves to American needs, Fairchild says. For this reason Mr. King has developed a practical and simplified instrument for terrestrial photogrammetry.

It combines a Keuffel & Esser 5078-E transit and a 4 x 5-inch plate camera. The telescope is mounted atop the camera, with its optical axis parallel with that of the camera. The compass box is fastened below, on a wide aluminum base plate, to the upper limb of the transit. Made of aluminum alloys for lightness, the camera has an 8 1/4-inch f6.8 Goerz Aerotar lens and contains fiducial marks in the focal plane which are adjusted by the U. S. Bureau of Standards. A specially designed back holds the glass-plate holder against the fiducial marks for maximum precision in the photograph. A level bubble within the camera is photographed on each negative as a check, and a counter is registered on each film as are the station number and the focal length of the camera.

Photographing under wide daylight conditions is said to be possible with the camera's Wollensak No. 4 shutter, which has speeds ranging from 1/50 to 1/2 second. It can also be set for time or bulb exposure. The diaphragm stop range is from f6.8 to f32.

Full details about this new instrument can be obtained from the Fairchild Camera & Instrument Corp., 88-06 Van Wyck Blvd., Jamaica, L. I., N. Y. Tell the firm you read a news report on its new camera transit in CONTRACTORS AND ENGINEERS MONTHLY.

### Dragline Tooth Points

Specifications for eight patterns of Page reversible center-shank tooth points are listed in a leaflet just issued by the Page Engineering Co. Four hints on how to get the best duty from your bucket points are also included in Form S 4-46. Copies can be obtained by addressing the manufacturer at Clearing Post Office, Chicago 38, Ill.

### New Dealers for Davey

The entire Davey line is to be carried by two new dealers in Indiana and Georgia, the Davey Compressor Co. has announced. Brown & Hubert, Inc., will serve Indiana from Evansville, while the Florida-Georgia Tractor Co. will supply its territory from Savannah and Waycross.

Eleven western New York counties

now have available sales, service, and equipment-rental facilities for all Davey products. The Brock Tractor Co., 1231 Seneca St., Buffalo, has been named a Davey distributor in that territory. Brock also represents Allis-Chalmers, Gar Wood, Baker, Buckeye, and Hough.

The Textile Oil Co. of Greenville, S. C., will handle Davey products in eight northwest counties of that state.

In Kentucky, the Metal Mfg. Corp. of Louisville will distribute all Davey equipment.

### FWD Again Making Heavy 12-Ton Truck

The Four Wheel Drive Auto Co. has resumed manufacture of the FWD Model M10, a 12-ton truck whose production was practically suspended during the war. The truck is especially applicable to snow-removal work.

Design improvements in the model include the FWD Universal cab, a



The new FWD Model M10 four-wheel-drive 12-ton truck is offered with either gasoline or diesel engines of 186 and 200 hp respectively.

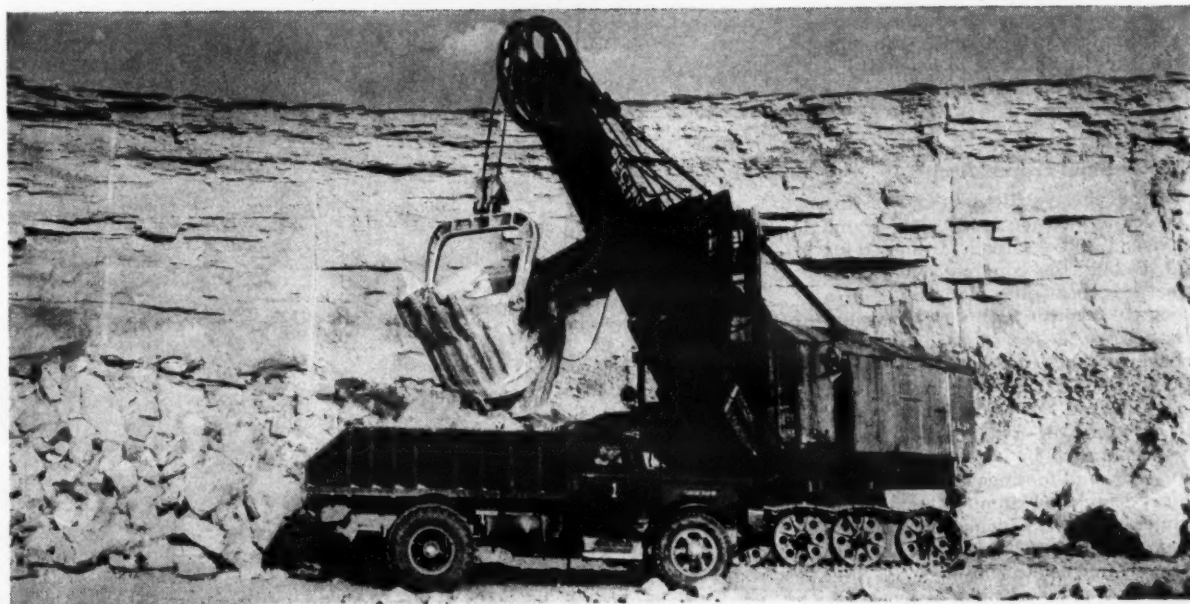
sturdy streamline radiator grille, and an improved heavy-duty axle, the firm says. The cab is said to feature a number of comfort and safety advantages.

The M10's standard engine is a gasoline unit having a rating of 186 bhp. Customer's option will allow installation

of a 200-bhp diesel. The truck has a gross vehicle weight of 44,000 pounds.

Complete specifications for the M10 will be sent at your request. Mention this notice when writing the Four Wheel Drive Auto Co., Clintonville, Wis.

# All Point Efficiency with SINCLAIR SPECIALIZED LUBRICANTS



**C**ONTINUOUS efficient operation demands no failure of any mechanical part. Good engine lubrication is not enough. Proper ALL-POINT protection is vital. Sinclair lubricants are designed for specific service at every individual point.

For engines . . . Opaline Motor Oil and Opaline TBT Motor Oil provide sure, safe lubrication. Sinclair Tenol for carbon-resistant Diesel lubrication.

For gears . . . Opaline Gear Lubricant provides extreme pressure properties to prevent galling and scuffing. It resists oxidation, flows

freely at low temperatures, and won't foam at high speeds.

For chassis . . . non-dripping Opaline Chassis Lubricant stays put. Its basic oil provides sure lubrication under extreme pressure. For wheel bearings . . . Sincolube meets all requirements of ball and roller bearing engineers. It doesn't thicken or thin out with temperature variations or separate during use.

Try these specialized lubricants for efficient, economical operation of each important mechanical service.

## SINCLAIR AUTOMOTIVE OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.



## Rigid-Frame Arch

(Continued from page 1)

forced-concrete structures in the vicinity of the arch—a 7 x 14-foot twin-box culvert 176 feet long, and a gravity-type-abutment underpass, through which a single spur track of the New Haven Railroad crosses under the parkway. Together with the work on the structures, Westfield Road was relocated for 1,100 feet, and the line of adjoining Lonsdale Avenue also was altered for a short distance.

The job got under way last November with excavation for the culvert and the railroad underpass. The cold weather was more favorable for work in this location as Harbor Brook, which flows through the culvert, was at lower stage than it is in the summer, and traffic was lighter over the railroad spur which serves the near-by York Hill Quarry. Traffic had to be maintained on this track—and was, except for a couple of months—during the construction of the underpass. Also, in the winter the ordinarily high water table had dropped somewhat and the gritty clay soil was more easily excavated. To make the foundations of these structures more stable, much of this unsuitable material was replaced with gravel from 4 to 12 inches thick at the box culvert and 12 to 36 inches at the railroad bridge. The excavation was done chiefly by a Northwest 155  $\frac{3}{4}$ -yard shovel.

The floor of the box culvert is 2 feet thick, the center wall is 1 foot thick, while the outside walls and roof are 1 foot 10 inches. A 24-foot fill goes over the top of the culvert. The railroad underpass is a long, high, narrow structure just wide enough for one track. The abutments are 73 feet long; but with the straight wings, the underpass stretches out 160 feet. Under the abutments the footings are 15½ feet wide and from 3 to 3½ feet deep; they support the gravity-type walls tapering from 4½ feet at the base to 1 foot at the top. The 25-foot-high walls support a 20-inch slab which serves as the parkway pavement.

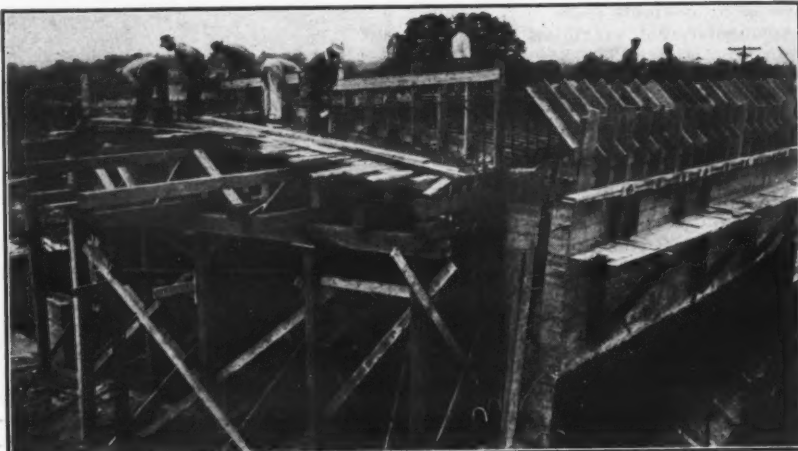
### Rigid-Frame Arch

North of these structures and resting on a rock foundation is the rigid-frame arch over Westfield Road. Designed for H-20 loading, the concrete overpass is 75 feet 4 inches long. It is built on a 13-degree skew, with a horizontal clearance of 42 feet and a minimum vertical clearance of 14 feet. The parkway, which will cross the bridge on a 2-foot fill over the center of the arch, will have two 24-foot concrete roadways separated by a 6-foot median strip. The wall footings are 8 feet wide x 6 feet deep; they support the tapering abutments 2 feet 3 inches thick at the bottom and 3 feet 8¾ inches at the top. At the haunches the arch is 3½ feet deep and at the mid-point it measures 1½ feet. Along the sides of the bridge are 3-foot rails.

To remove the necessary rock for the footings, holes were drilled by an Ingersoll-Rand wagon drill powered by an I-R 315-cfm compressor. A depth of 12 feet was reached in some locations, using 6 and 12-foot lengths of 1½-inch drill steel with bits reducing from 2½ to 1½ inches. American 60 per cent dynamite was used in the blasting.

After the footings were poured, the wall forms were built. The contractor used ¾-inch plywood on the inside face which will be exposed, and ¾-inch lumber of random widths on the back. The studs were 2 x 6's set on 12-inch centers backed by double 2 x 6's for wales on 2½-foot centers. Richmond Tyscrus were placed on 3-foot centers both ways to hold the forms in place.

The arch pour required a goodly amount of form work, especially in the



C. & E. M. Photo

Forms for the concrete deck pour are set at the east end of the bridge designed to carry Wilbur Cross Parkway over Westfield Road near Meriden, Conn.

framework on which the entire superstructure was supported. This timber falsework consisted of thirteen rows of seven posts set on 7-foot centers both

ways and resting on mud sills. The posts were 6 x 6-inch timbers capped with 10 x 10's. Across the caps over each row of posts 8 x 8 stringers were

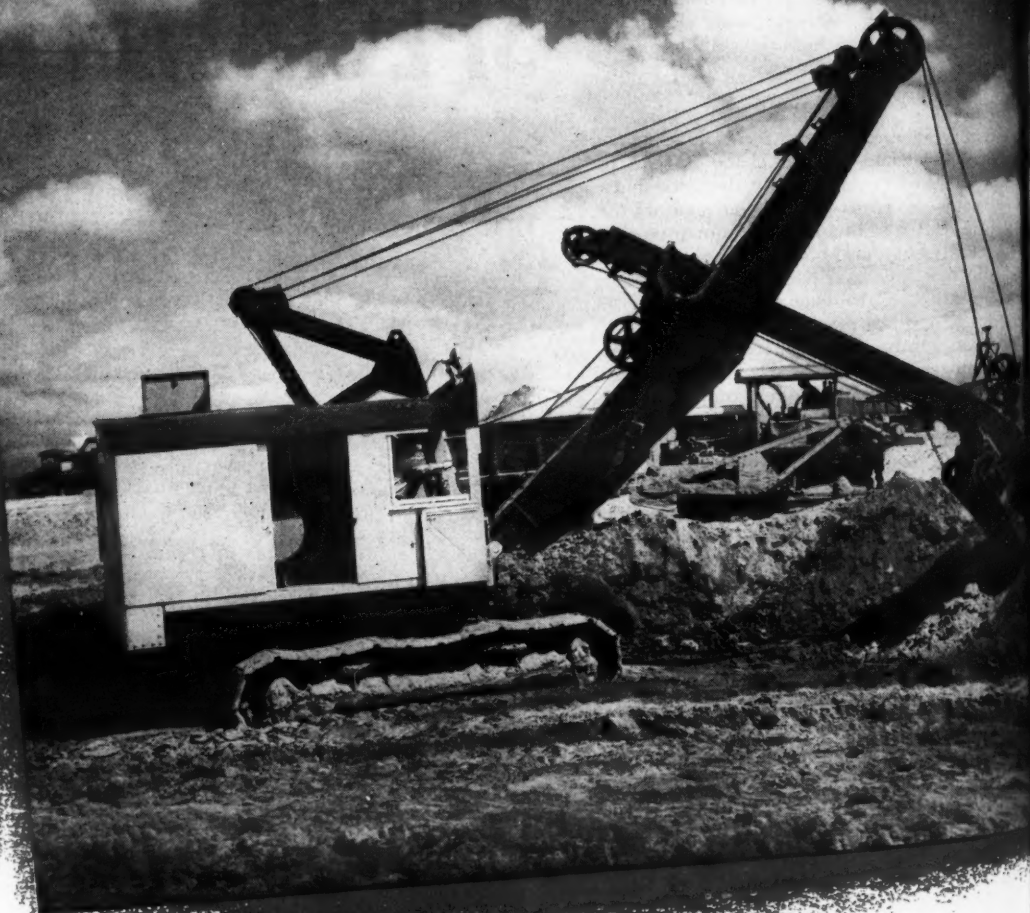
laid, except over the outside rows where larger 8 x 12-inch sections were employed. On top of the stringers 4 x 6 posts were laid out in rows, each with a different height conforming to the curve of the arch. Over the tops of these posts 2 x 8 ribs, 8 feet long, were stretched across the entire arch, and in turn were covered with 1½-inch lagging running lengthwise of the bridge. As the under side of the arch is exposed, a layer of ¾-inch plywood was nailed on the lagging. Cutting of the form lumber was speeded with the use of a 14-inch table saw and a portable Skil-Saw.

### Concrete Batching Plant

A batch plant was set up on the project in a location central to all three structures. The sand and two sizes of stone were fed into a Blaw-Knox 85-ton 3-compartment bin by a Lorain truck crane with a 50-foot boom and a ¾-yard clamshell bucket. The sand was purchased from the Meriden Sand

(Continued on next page, Col. 4)

# KEEP ENGINES



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TEXACO STAR THEATRE  
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EDDIE BRACKEN SHOW  
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Metropolitan Opera  
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# TEXACO



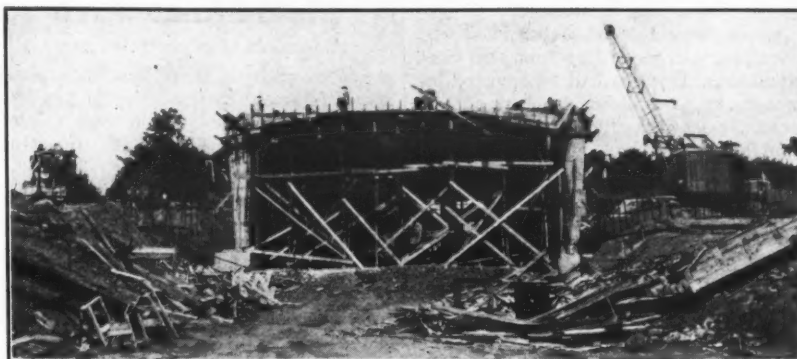
## New Tread Design Ups Tractor Tire's Grip

Greater traction, from a bite that is 30 per cent deeper, and 30 per cent longer life expectancy are advantages claimed for the new Plow Contour wheel-tractor tire which Seiberling Rubber Co. has put on the market.

The tire has tread design with curved, deep lugs, which works on newly developed principles of traction, Seiberling says. Each lug has a contour like the moldboard of a plow, the tread design that is open at the center, making for self-cleaning. The tire is said to have great resistance to side-slip-page.

The body of the Plow Contour tire is built of Saf-Flex cord, Affinite compound, and Seiberling's special agricultural-tire rubber. The firm's Special Service line of tubes, with Air-Water valves, can be used with the new tire.

You can secure full details about the new Plow Contour tires from the Seiberling Rubber Co., Akron, Ohio.



C. & E. M. Photo

To the left, in this west-end view of the bridge, is the Rex paver, and to the right, the P&H truck crane, used by M. A. Gammino Construction Co. of Providence, R. I.

## N. Y. Uses Aerial Surveys

Aerial surveying techniques developed during the war are being used on a large scale by the New York State Department of Public Works in planning its new highways. Bids for surveys, topographic maps, and photo-

graphic mosaic maps covering about 105 square miles were received recently by Superintendent Charles H. Sells.

Scheduled for completion before winter, the surveys will be used to facilitate the location and design of eight projected routes in scattered sections of the state.

## Rigid-Frame Arch

(Continued from preceding page)

& Stone Co. It was delivered to the job after a 6-mile haul in trucks hired by the contractor from A. J. Waldon Co. of Hartford. The stone was obtained from the York Hill Trap Rock Co. from its quarry only 2 miles away, and trucked to the batch plant by G. W. Hepple of Meriden.

Two International K7 trucks owned by the contractor were used to haul three 6-bag batches each from the sand and stone bins to the paver. They stopped on the way to pick up cement at a Butler 300-barrel bin about 200 feet distant. Bulk cement was shipped to the job from the North American Cement Corp. plant at Alton, N. Y., in cars which parked on the spur track leading to the quarry, while they were unloading into a trough between the rails. From that point the cement was pushed along by a worm gear to an enclosed elevator which lifted it to the storage bin. The batch trucks backed under the bin to get the cement. The reinforcing steel was also delivered to this same spur track after a 350-mile trip from the Sparrows Point, Md., plant of the Bethlehem Steel Co. The truck crane unloaded the cars.

### Concrete Pours

The batches were mixed in a Rex 27-E paver and then dumped into a Blaw-Knox 1-yard concrete bucket which was lifted to the forms by a P&H truck crane fitted with a 60-foot boom. Water for the batches was tapped from a near-by city main. For vibrating the concrete, the contractor used two Mall vibrators with flexible shafts, and also two Viber electric vibrators driven by a Universal 5-kw generator. During the winter when the two smaller structures were poured, the concrete was kept from freezing in the forms by passing steam through 1½-inch pipes which were strung around the forms. The steam was obtained from a Bigelow 75-hp coal-burning locomotive-type boiler.

A typical 6-bag batch of the 1 to 2 to 3½ concrete had the following weights:

Cement	564 lbs.
Sand, plus moisture allowance	1,128 lbs.
Stone, ¾-inch	592 lbs.
Stone, 1½-inch	1,382 lbs.
	3,666 lbs.

To this 5½ gallons of water was added for each bag of cement. The gradation of the two sizes of stone was as follows:

Sieve Size	1½-Inch Stone	¾-Inch Stone
1¾-inch	100	.....
1½-inch	95-100	.....
1-inch	35-70	100
¾-inch	0-25	90-100
½-inch	0-5	10-40
¾-inch	.....	0-5
No. 4	.....	0-5

The box culvert contains 1,140 cubic yards of concrete, the railroad structure 1,200 yards, and the arch bridge 1,550 yards. The longest continuous pour occurred when the deck slab of the arch was constructed. This pour of 290 yards was done in 9 hours when an additional paver, a Ransome 27-E, and another truck crane, a Lorain with a 45-foot boom, were rented for the day from a contractor on an adjoining bridge job. A paver was stationed on each side of the bridge and as fast as the batches were mixed they were swung into the air by the truck cranes and dumped into the forms.

The slab was cured by running water over it for 72 hours. As the bridge is on a slight grade, a 2-inch perforated pipe was laid at one end, permitting water to run over the entire slab to keep it continually wet. No pumping was required as the pressure from the city main assured a steady flow. When the concrete was cured and the forms removed, the top of the slab was water-

(Concluded on next page, Col. 3)

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## FOR ALL CONTRACTORS' EQUIPMENT





The three new Adams graders for medium, heavy, and extra-heavy duty have the same overall design, featured by the high-arch front axle.

### High-Arch Front Axle Marks New Graders

Developed from five years of intensive research, three new motor graders have been introduced by the J. D. Adams Mfg. Co., 217 So. Belmont Ave., Indianapolis 6, Ind. Built for medium duty, heavy duty, and extra-heavy duty, the three models feature a distinctive high-arch front axle. Special bulldozers and snow plows have been designed as optional equipment for all three units.

Greater clearance afforded by the high axle eliminates the force needed to bulldoze the axle through large windrows, since the windrow is now straddled, Adams says. This factor, together with an entirely new design and the use of tapered roller bearings, is said to aid materially the steering of the grader.

International diesel engines having eight forward and two reverse speeds power the graders. The engines are controlled from the cab, and have push-button starting.

### Wire-Rope-Splicing Rig

To take care of all necessary operations in the splicing of wire cable, Gar-Bro Mfg. Co. offers a splicing rig. This, self-contained unit, designed for plant or field use, is described in a leaflet, Bulletin 73, which the firm will send you on mention of this notice. Write to 2416 E. 16th St., Los Angeles 21, Calif.

### Lima Outlets in Canada

Four dealers have been appointed as Canadian distributors for Lima shovels, cranes, and draglines, the Lima Loco-

motive Works has announced.

Armco Drainage & Metal Products, Winnipeg, will serve Manitoba and Saskatchewan. Ontario will be covered by Equipment Sales & Service Ltd. of Toronto. The Automotive Products Co. of Montreal will carry Lima products in Quebec. Dietrich-Collins Equipment Ltd. will serve British Columbia from Vancouver.

### Bin-Level Indicator

Described as the "eyes of the bins," a bin-level indicator is featured in a folder issued by the Bin-Dicator Co. The device is used in bins and hoppers, on elevator boots and conveyors, and for weighing and blending devices, to control the feed and show the amount of material on hand.

Installation sheets will be supplied, and typical applications of the Bin-Dicator will be described by the manufacturer on request. Write to the company at 14615 E. Jefferson Ave., Detroit 15, Mich.

### Rigid-Frame Arch

(Continued from preceding page)

proofed with a mopping of asphalt paint, followed by the spreading of two layers of fabric which were also swabbed on both sides with the same bituminous coating.

The backfill over and around the three structures was made with material taken from a borrow pit where a Marion 1½-yard shovel loaded a 15-yard end-dump and a 17-yard bottom-dump Euclid for the average 500-foot haul. The dirt was spread and compacted by a pair of Caterpillar tractor-dozers, a D7 and a D2. The contract was completed by October.

### Quantities and Personnel

The major items included in the contract were:

Roadway excavation	14,342 cu. yds.
Bridge excavation	3,721 cu. yds.
Rock excavation	1,429 cu. yds.
Borrow	53,698 cu. yds.
Steel-bar reinforcing	325,000 lbs.
Class A concrete	3,890 cu. yds.

From 40 to 50 men were employed on

the bridge contract at the peak of construction. E. S. Tillman was Superintendent for the M. A. Gammino Construction Co., and I. Resnikoff was Inspector for the Connecticut State Highway Department. The job is located in the residency of E. S. Lawler, Resident Engineer, with L. J. Conaty, Assistant Resident Engineer. The Department is headed by William J. Cox, Commissioner, with Arthur W. Bushell, Deputy Commissioner and Chief Engineer. Leslie G. Summer is Director of Engineering and Construction.

### Compressors for Shops

Built for use in the garage, shop, or industrial plant, Wayne air compressors are the subject of a 24-page booklet issued by the Wayne Pump Co., Fort Wayne 4, Ind. This catalog lists the various Wayne compressors in both the single-stage and two-stage classes, high and low pressure. Copies of the catalog, Form 714-R, will be sent on mention of this notice.

# NEW!



Lower Cost Hauling up to 20 Tons  
"G. T. W."

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"Job-Rated"

## HEAVY-DUTY TRUCKS

WITH NEW 282 AND 331 CUBIC INCH POWER PLANTS—ENGINEERED TO SET NEW POWER AND ECONOMY STANDARDS!

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They're powered by two brilliant truck engines—of 282 and 331 cubic inch displacement—in which horsepower-to-weight ratios reach a new high!

These engines develop 225 and 270 pound-feet of torque respectively—and maintain a high torque output over a wide range of engine revolutions.

Engine cylinder walls, of chrome nickel molybdenum alloy cast iron, are so hard that wear is almost non-existent. Every valve is made of silchrome, one of the hardest metals known. Exhaust valves are sodium-cooled, and valves and valve seat inserts are stellite-faced.

Everywhere, unnecessary surplus weight is eliminated by improved design and advanced metallurgy. New and strictly heavy-duty clutches, and a remarkably efficient five-speed transmission—coupled with rear axles of entirely new design—provide a highly efficient transmission of driving torque to the wheels.

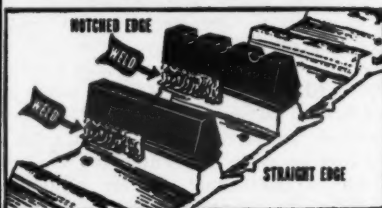
Despite their husky construction and rugged, brute strength—these trucks handle with remarkable ease. It's a "cinch" to keep them rolling—even on steep grades with capacity loads.

If your transportation requirements fall within the 18,500 to 23,000-pound gross vehicle weight ranges (up to 40,000 pounds G.T.W.) . . . by all means get the complete story of these great new Dodge "Job-Rated" heavy-duty trucks. We believe you'll find them your long-awaited answer to lower-cost hauling in their capacity ranges!

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# Auxiliary Crusher Treats Tailings at Rock Quarry

**Production Boosted by Installing Second Unit To Crush Oversize at County Limestone Pit**

† Limestone tailings which fail to pass a 1-inch screen are immediately recrushed to size at the Floyd County, Ga., rock quarry on Black's Bluff Road 2 miles west of Rome. By boosting limestone production this way, and by other methods, Jere Dodd, County Public Works Superintendent, moves quickly and determinedly to meet a tremendous backlog of war-delayed construction and maintenance on the county highway system.

This northern Georgia county in rich agricultural country has a road system of 1,200 miles, most of which is unsurfaced and untreated. Awake to the requirements and demands of today's traffic, Public Works Superintendent Dodd has laid out a long-range program; it is designed to protect existing highway surfaces and to bring untreated and unsurfaced county roadways to modern standards. The ambitious 1946 program included the re-sealing of some 30 miles of old bituminous-surfaced highways and the single-surface treatment of another 30 miles of roads, with double treatment over these same roads planned for 1947.

This surfacing and resurfacing program during this year's construction season and the 1947 season is going to require a lot of crushed limestone, from 1 to 1/4 inch in size. At the county quarry on Black's Bluff Road, a 16 x 24 Cedarapids crusher during the early spring was turning out about 125 tons of crushed rock daily in three sizes: from 1/4 inch down; from 1 to 1/4 inch; and tailings up to 2 inches in size.

## Addition to Crushing Plant

The tailings were not suitable for surfacing, and daily output was reduced by the extra work of rescreening and re-crushing. Jere Dodd considered the situation, recalled the amount of construction and maintenance to be done, and bethought himself of an 8 x 16 Cedarapids crusher which had been standing idle in the near-by county shop. In short order, convict labor assigned to the County Highway Department had the 8 x 16 crusher set up below the quarry, immediately adjacent to the 16 x 24 crusher, with the conveyor from the larger screen feeding tailings directly to the 8 x 16 crusher. The system worked well. It boosted production of crushed limestone, in sizes from 1 down to 1/4 inch and less, to over 150 tons a day.

The two crushers are located directly at the edge of the county's large limestone quarry. There the stone is shot and loaded by a Bay City 5/8-yard shovel to 1 1/2-ton Chevrolet, Ford, Dodge, and Indiana trucks. Convict hand labor supplements the shovel in loading the trucks. The County uses an Ingersoll-Rand compressor in the quarry. The crushers are powered by a squirrel-cage-type electric motor. An 8 x 36 Cedarapids crusher and a Day pulverizer act as stand-by units.

Crushed limestone will be produced during the autumn and winter, with the crushers operating as near capacity as possible. The rock which is not used as surfacing this season will be stockpiled near the quarry to be used for stabilizing weak bases next spring.

## County Equipment

Floyd County is well prepared to embark on its long-range program of re-sealing and resurfacing county highways. Only recently a new Etnyre

670-gallon distributor was delivered to bolster county-owned bituminous-surfacing equipment. In addition to the Etnyre, the County now has on hand a 5 to 8-ton Buffalo-Springfield roller; a Cleaver-Brooks 2-tank car heater; three No. 11 and two No. 10 Caterpillar motor graders; a Galion motor grader; a Caterpillar D7 tractor with an 8-yard Slusser-McLean sluicer pan; and 25 Chevrolet, Ford, Dodge, and Indiana 1 1/2-ton trucks.

Occasionally snow falls, even in northern Georgia, to add to Floyd County's road-maintenance problems. When this infrequent plague of the Rome Chamber of Commerce does occur, Superintendent Dodd calls out the six motor graders and in no time the blades have removed snow, ice, and

slush from the roadways.

## Equipment Upkeep

A county, like a contractor, cannot hope to maintain roads without maintaining the equipment that works on them. Floyd County is well equipped to keep its road-building and maintenance machines out on the county system instead of in the shop. County Superintendent Dodd personally checks

service records turned in by the operators of all county equipment. A greasing and servicing schedule has been set up for each piece of equipment, and delinquencies in preventive maintenance do not escape the eye of the County Public Works Superintendent.

Although it is the policy in Floyd County to keep the machines out of the shop as much of the time as possible, (Concluded on next page, Col. 3)

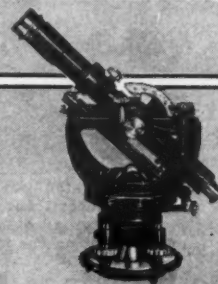
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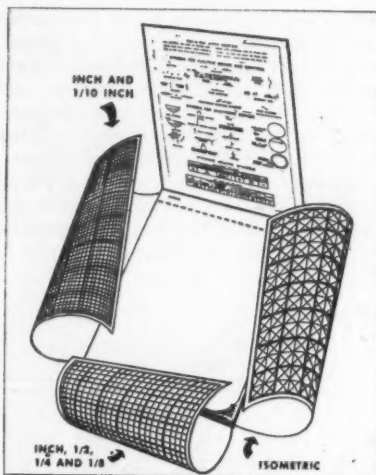
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LOS ANGELES

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Send for booklet explaining  
how YOU can take a shorter  
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With the Jiffy Sketch scale-drawing pad, properly proportioned drawings may be made easily and quickly in the office or out on the job.

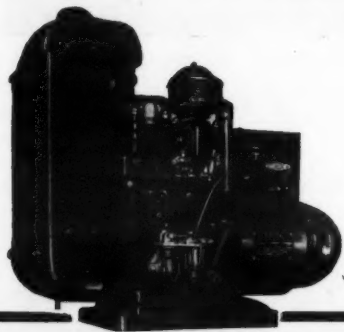
### Scale Drawings Made With Pencil and Pad

The engineer or the contractor is often faced with taking notes and making sketches. He may be studying a job before submitting a bid, or he may be trying to illustrate a point to a work-gang "up front" on the project. A newly introduced scale drawing pad is said to be a real time-saver for busy men who must convey their ideas quickly and accurately. With it they can make properly proportioned drawings without using any instrument but a pencil.

The Jiffy Sketch pad comprises 75 sheets of blank tracing tissue bound in a cover that has four flaps. Three of the flaps have printed scales. One is blocked off in inches and tenths; the second scale has inches, halves, quarters, and eighths; the third is isometric.

When using the pad, one sheet of tissue is held out and the flaps are folded in so that the scale to be used is on top. The heavily printed lines show through the tissue, making for accurate tracing. Drawings made on the tissue may be blueprinted.

The pad measures 9 x 12 inches. The sheets are perforated for easy removal.



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Data printed on the back of each cover flap include symbols for use in drawing, basic mechanical drafting standards, the decimal equivalent of fractions, with circumferences and areas of circles.

Jiffy Sketch will be put on general sale in the near future. In the meantime, a sample pad is being offered for \$1.00 by the Jiffy Sales Co., 1842 E. 37th St., Cleveland 14, Ohio.

### Data on Cranes, Shovels

Material-handling equipment of the smaller sizes is illustrated in a 24-page catalog offered free by the Unit Crane & Shovel Corp. The firm specializes in building 5 and 10-ton cranes and 1/2 and 3/4-yard excavators that are convertible to all attachments. The equipment features unit construction and a full-vision cab, among other things. Copies of Catalog 46 can be obtained from the firm at 6309 W. Burnham St., Milwaukee 14, Wis., on mention of this notice.

### Auxiliary Crusher Treats Tailings at Rock Quarry

(Continued from preceding page)

when breakdowns do occur, the County is prepared to take care of them. All major and minor repair and maintenance work on Floyd County equipment is handled at the County shop, near the rock quarry, where three full-time mechanics are equipped with all modern tools. In addition to the usual small shop tools, the county shop boasts lathes, drill presses, and welding outfits.

### County Force and Policy

During the war years, with only convict labor available, it was possible to do only the absolute minimum of routine maintenance. Now, with about 40 regularly employed workmen augmenting an average of 60 convicts, Jere Dodd hopes to get his roads in good shape. As the County emerges from the war period of "essential" work, the

County Public Works Superintendent is determined on one thing.

"We're going to bring our present highway system up to date first," says Mr. Dodd. "Reconstruction is the order of the day, but there is going to have to be a mighty good reason for new construction before we okay it."

### Heil Sales in South

The establishment of a new district sales office at Atlanta, to serve North and South Carolina, Georgia, Florida, Alabama, and part of Tennessee, has been announced by The Heil Co. Located in the Candler Building, the office will be supervised by Jack Davies, District Manager.

Alec Milne, former national accounts representative at Detroit, will work out of the Atlanta office selling bodies, hoists, and tanks. He succeeds Ray Long, who has joined the Southern Equipment Sales Co. of Greenville and Columbia, S. C., as its Vice President for Sales.



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Contractors know that Jaeger builds for that kind of service — with 75% to 100% bigger, cooler valves that operate indefinitely without carbon, with 20% to 30% slower, long-life piston speeds (800 f.p.m.), with full force feed lubrication, lifetime clutches, and interchangeable precision parts. They know that Jaeger standardizes on dependable Caterpillar and International diesels and Continental gasoline power. They know that engine and compressor will safely trail wherever a truck can travel, protected by the most rigid frame and roadable mounting ever put beneath a portable compressor.

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# Heavy Grading Starts Highway Realignment

## W. H. Noel Co. Uses All Its Available Excavating Equipment on New Route; Solving Job Problems

U. S. HIGHWAY 14 west of Fort Pierre, S. D., is one of those stretches of obsolete road common in 1946 but soon to be a memory. This dangerous and crooked gravel highway is being replaced. In its stead will be a new, modern thoroughfare 34 feet wide including shoulders, almost all on a new location. It will cut through the Missouri River Breaks and meet the high-speed asphalt of Route 14, about 30 miles west of the state capital.

The new road bears the official FAP number 457 (2). It has been cut through 14.61 miles of hilly terrain by W. H. Noel Co. of Jamestown, N. D., under a \$278,000 contract. The South Dakota State Highway Commission prepared the plans for the new job, and now is supervising its construction.

The Noel contract included all earth work to bring the embankment to grade, and the installation of concrete culverts and corrugated-metal pipe to carry drainage through the heavy fills. Principal item of the job was about 1,019,000 cubic yards of excavation and fill in gumbo and shale. The black soil handled a little harder than was anticipated when the bid was made. But even so, the 5 per cent shrinkage allowance mentioned in the plans had not been required when the job was visited in September for CONTRACTORS AND ENGINEERS MONTHLY.

The earth-moving equipment fleet consisted of a Caterpillar DW10 with a LaPlant-Choate scraper; 4 Caterpillar D8's as pusher tractors and bulldozers; 2 Caterpillar D8's with LeTourneau Model RU Carryalls; and 2 LeTourneau Super C Tournapulls. This equipment started the job rolling on May 10, 1946. Attendant equipment included 2 Caterpillar No. 12 motor graders, 3 Caterpillar D4's with sheepsfoot rollers, 2 pickup trucks, 3 service trucks, and 2 water-tank wagons of 1,300-gallon capacity each. Although 1,000,000 cubic yards in 175 working-weather days turned out to be a large bite for this list of equipment, the job moved ahead on schedule.

### Material, Heavy-Equipment Shortage

Cut and fill sections had been balanced on the plans for free hauls of 1,000 feet. However, many of the fill sections also required the installation of corrugated-metal or concrete culverts. Culvert pipe was very difficult to secure. Material ordered at the outset of the job did not arrive until September. The only way Superintendent A. W. Orton could find to get around this difficulty was to move his equipment around from one balance point to another, where this material either had arrived or was not required. Then when the pipe arrived it was immediately installed. Dirt was tamped around it by three Worthington pneumatic tampers which were powered by a Worthington

Blue Brute compressor rated at 105 cubic feet per minute. Heavy grading equipment then moved in to cut the heavy hills away and fill up the gulches.

The W. H. Noel Co., working on several heavy grading jobs in the Dakotas, has been unable to purchase anywhere near the number of pieces of heavy equipment it needs. Tractors, scrapers, Tournapulls, and other grading machinery were therefore spread thin and worked at peak capacity to perform as much construction work as possible in 1946.

### Earth Work

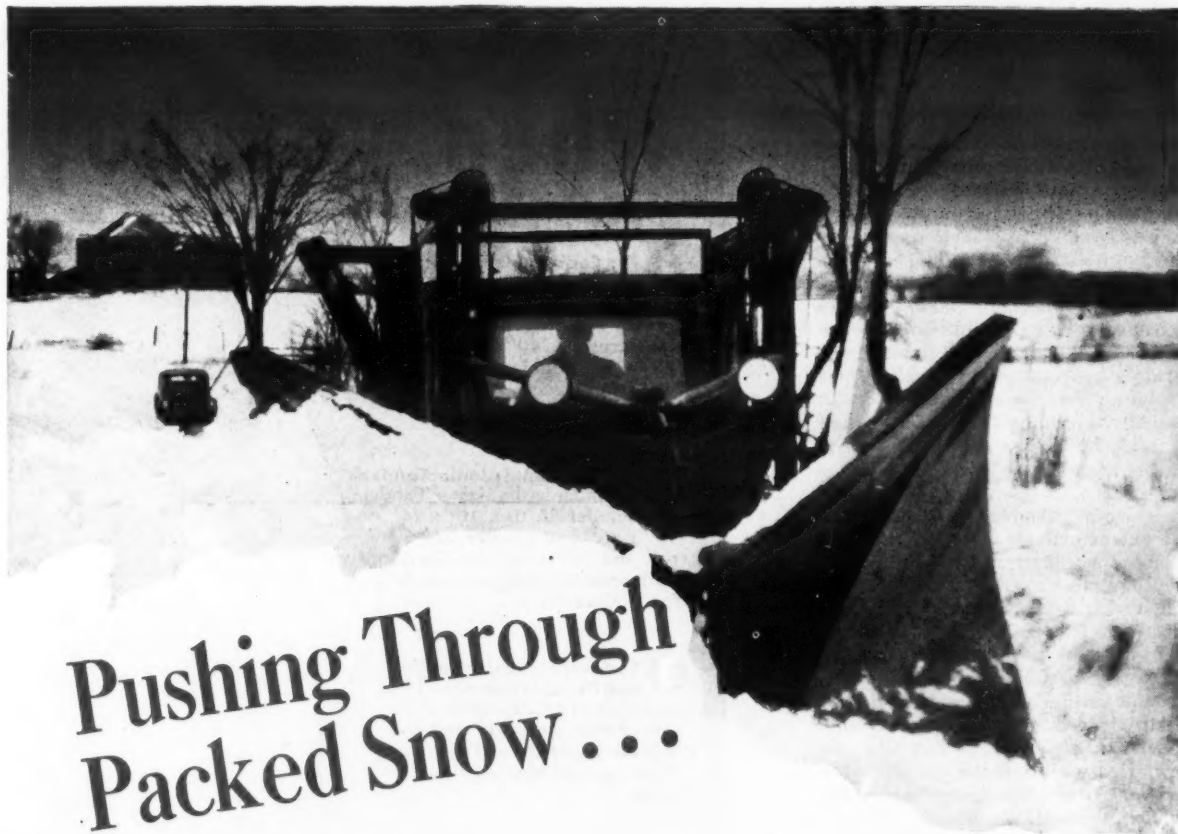
The road has been built with side slopes and backslopes ranging from 2 to 1 to 5 to 1, depending mostly on the depth of cut. The embankment has been



C. & E. M. Photo  
A Caterpillar DW10 and a LaPlant-Choate scraper, maneuvering at the edge of a fill on the Noel grading job near Fort Pierre in South Dakota, are given a push by a Caterpillar D8 and scraper.

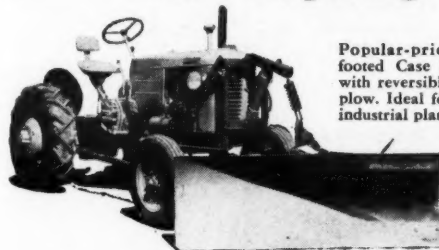
compacted to a finished top width of 34 feet. Slopes and berms give the embankments excellent stability and a

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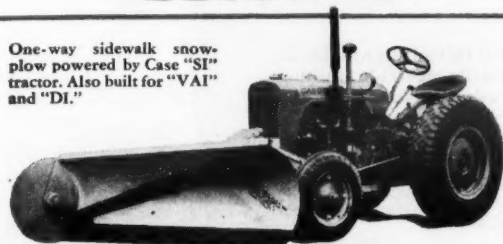


## Pushing Through Packed Snow...

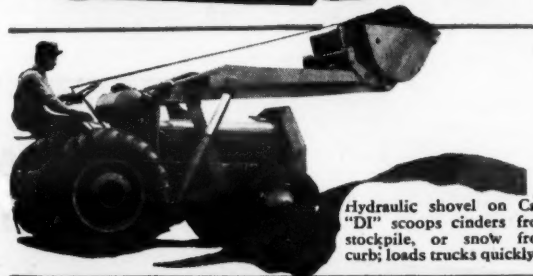
### No Pampering



Popular-priced, nimble-footed Case Model "VAI" with reversible blade snowplow. Ideal for institutions, industrial plants.



One-way sidewalk snowplow powered by Case "SI" tractor. Also built for "VAI" and "DI."



Hydraulic shovel on Case "DI" scoops cinders from stockpile, or snow from curb; loads trucks quickly.

You have two chances to lick the snow problem when you have a big plow powered by a Case "LAI" tractor. Normally you keep ahead of the snow. If exceptional storms block the roads, you are ready to open them. These compact, low-cost units break their own trail, turn in their own cut. Traction wheels are so close to the plow that they carry side thrust as well as forward push, make easy work of deep-cut widening.

Case tractors have extra strength to stand shocks and strains in sub-zero cold. Case engines and gears have extra stamina to "lug along" indefinitely under galling loads. The way they work long hours without faltering, long years with little upkeep, has earned their enviable reputation for ENDURANCE.

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In Business to Serve You. Your Case industrial distributor is located and equipped to supply complete service not only on Case tractors and engine units, but on related equipment. His lines are selected and his personnel is trained with your local conditions and requirements in mind. Take advantage of his varied experience in power and allied equipment applications. J. I. Case Co., Racine, Wis.

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## Heavy Grading Starts Highway Realignment

(Continued from preceding page)

good appearance.

These berms, outside the embankment limits, were an ideal place to deposit stripped topsoil and grass. Grass, plus about 10 inches of roots and topsoil, was hauled out and worked into these places. Loading of the cuts then started downhill, with the contractor working all the equipment together to make the greatest possible use of the pusher tractors. The rubber-tired equipment was put generally on the same run as crawler equipment, but the haul road was wide and there was ample room for these faster machines to pass.

Two Caterpillar D8's were used in the cut sections to push the Tournapulls and Carryalls while they were being loaded. One D8 was used with a 2-tooth LeTourneau Rooter to rip up a deposit of soft shale. Since shale occurs only in thinly bedded planes and is not too difficult to dig, the contractor did not have to use dynamite.

### Meeting the Labor Problem

One of the most difficult features about this excavation job was the scarcity of good equipment operators who were willing to work for the scale wage. Pierre is situated in a section of South Dakota where the prevailing scale is lower than in the surrounding territory. Faced with a shortage of men, the Noel Co. brought in a portable cook house and two large trailers with bunk space, offering a bed and meals for \$10.50 per week as an inducement to operators to stay. Many of them left regardless of this, after having worked a few days, because wages were higher 200 miles west.

This labor turnover was solved to some extent at least by giving deserving laborers a chance at the controls of heavy equipment. If a man was interested, Orton first assigned him to one of the little Caterpillar D4's, where he could tow a sheepfoot roller around in second gear. After the man had mastered the smaller machine, and showed a desire to graduate to bigger equipment, Orton arranged for him to make a few trips with a regular Tournapull operator. After a few hours of this observation, the man was given a Tournapull to load in a borrow pit. The experienced Tournapull operators were "good joes", on the whole, and they drove the little D4's with a grin while they kept a watchful eye on their protégés.

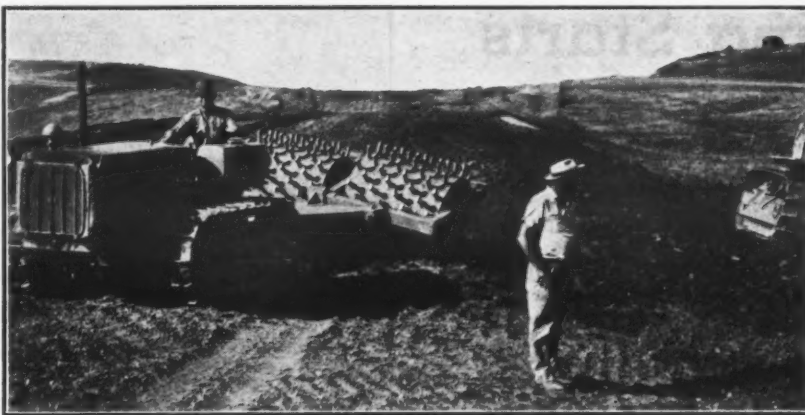
When a new man asked questions, they tried to answer him. When an embryo operator turned around too close to the edge of a bank and got one wheel off in the soft dirt, he was cautioned about it.

"Hey, fella, that bank you're on now is only 4 feet high, but one of these days you'll be working on an edge 40 feet high," he was told. "You don't want to break your neck, now do you?"

The new men were broken in on some of the shallow cuts. Then they moved in on some of the really hazardous work where cuts 25 to 30 feet deep were made, and the dirt dumped in fills up to 35 feet deep. One particular location has an elevation differential of 80 feet from the toe of the fill to the top of the cut. There are many places where they had to climb out in first gear, after dumping.

### Other Job Problems

Although water-tank wagons were brought in and arrangements made to haul water from the numerous reservoirs built in South Dakota by the Soil Conservation Service, it was found that they were not needed. The natural gumbo had a moisture content of about



C. & E. M. Photo  
A sheepfoot roller processes fill as scrapers and Tournapulls haul it in on the 14-mile South Dakota grading job to realign U. S. 14.

12 per cent anywhere below 2 feet from the ground surface. The subgrade showed extremely stubborn "boiling" characteristics in loading to a scraper bowl, but it did dump clean in thin 6-inch lifts. One or two sheepfoot rollers

working constantly obtained a uniform density which was satisfactory to the State Highway Commission. No density tests were run on embankment material, but Superintendent Orton and Chief Inspector H. E. Pettijohn esti-

ated that it would run something over 90 per cent of optimum laboratory weight.

The job had been bid with the idea that the five pieces of hauling equipment would move 11,000 cubic yards per 20-hour day, on hauls from 500 to 1,000 feet. Early in the job Orton was agreeably surprised to learn that they would exceed this figure. Then came the handicap of no culvert pipe. On days when the equipment had to be moved and started somewhere else, the output dropped down to 6,000 yards a day. When the pipe finally came, the machines moved back with the same loss of production. Because of this fight for scarce material, the job necessarily had to be done by hopping from one cut to another. It is not unusual in 1946 to see contractors in many parts of the country trying to accomplish work in spite of these difficulties . . . some of them on 17-cent dirt!

When the bid was made, the job had been figured very close. Orton did not (Concluded on next page, Col. 4)

## when you buy a crusher

1 The Cedarapids Master Tondem—100 to 150 tons per hour of material are easy for this big gravel crushing plant. 10' x 36" jaw crusher, 40' x 22" roll and 36' x 12' double-deck horizontal vibrating screen. Ask for Bulletin MT-1.

2 The Cedarapids Junior Tondem—Similar to the Master Tondem but smaller in size. 10' x 24" or 10' x 36" jaw crusher, 24' x 16" roll and 36' x 10' double-deck horizontal vibrating screen. Ask for Bulletin JT-2.

3 Cedarapids Junior Tondem and Portable Primary—The addition of a Cedarapids Portable Primary quickly converts a Master, Junior or Pitmaster from a gravel plant to a quarry plant.

4 Cedarapids Hammermill Plant—Here's one of the newest Cedarapids portable plants with a 4031 Cedarapids Hammermill for producing aggregate and roadstone. Ask for descriptive literature.

5 Cedarapids Pitmaster Straightline—This is our smallest portable straightline plant. 10' x 16" jaw crusher, 16' x 16" roll and 36' x 10' double-deck horizontal vibrating screen. Ask for Bulletin PS-1.

6 Cedarapids Utilized Plant—Here's the most versatile portable crushing, screening and washing plant ever offered because it fits all aggregate production requirements from 100 up to 1000 tons with almost any desired capacity. Ask for Bulletin Util-1.

### IOWA DEALERS

Iowa Dealers are qualified by training and experience to help you get real low-cost production in your crushing, screening and asphalt mixing operations—to recommend and sell equipment that will enable you to meet the strictest specifications at a good profit—and service your equipment to assure the minimum of lost time. There's a Cedarapids dealer in almost every important city ready for your call.

IOWA MANUFACTURING



## Hydraulic Controls On New Motor Grader

Snow-fighting is but one of the many duties performed by the Model 102 motor grader, announced by the Galion Iron Works as successor to its Model 101. The new heavy-duty model is said to have the power, weight, strength, and versatility to tackle all types of grading jobs.

Hydraulic controls on the blade, scarifier, and steering apparatus, a 360-degree operating range for the circle, and front tires the same size as the rear are among the features of the 102. The unit is powered by a 76-hp diesel engine, it has heavy-duty transmission with a wide range of speeds, and enclosed gears.

A rugged single-member frame distributes the weight and is set on a heavy front-axle assembly, Galion says. All controls, both for the drive and for circle and subassembly frame, are centralized on the operator's platform, which can be open or enclosed.



The new Galion Model 102 diesel-powered grader is designed for year-round road work. Equipped with a snow plow and wing, it is ready for heavy-duty winter service; other available attachments are a V-type scarifier and a bulldozer blade.

In addition to the heavy-duty V-plow shown in the accompanying photograph (it clears a 132-inch path), the 102 can be fitted with the 12-foot snow wing also shown, with a V-type scarifier, or a bulldozer.

A detailed description of the new

Model 102, complete with specifications, will be sent you by the Galion Iron Works & Mfg. Co., Galion, Ohio, on mention of this notice.

Protect your future. Insure security by buying U. S. Savings Bonds.

## Heavy Grading Starts Highway Realignment

(Continued from preceding page)

feel that the margin of profit would justify extensive surface work on one section of road before the new highway was finished as a unit. Finished work open to traffic only gets dusty again, and develops traffic marks. Accordingly, the fills and cuts were brought to hand-level grade, perhaps within an inch or two of the final location. The state highway surveyors then set their blue tops. When the road is about all done—probably this month—the two Caterpillar No. 12 motor graders will start to work dressing the road to its final finish. The dirt will be spread out from a thin windrow. It will be sprinkled lightly, and if the lifts are as thin as is now indicated, rolling may not be necessary since it is purely a dressing job.

Heavy equipment has been fueled and greased once every 10-hour shift on the job by a truck-mounted service unit. The job has had no regular heavy-equipment-repair department, and repair parts were frequently installed right out in the field. This part of South Dakota is clean and remarkably free of dirt and grit for field mechanical work.

Installation of culvert pipe up to 72 inches in diameter included what is reported to be one of the longest reinforced-concrete pipes ever placed in South Dakota. The piece is 360 feet long, 60 inches in diameter, and weighs 215 tons. It was shipped in 6-foot sections and the pieces joined together. After it was installed and preliminary backfill compacted around it, the heavy equipment moved in and with the help of sheepfoot rollers brought the embankment up rapidly. The last of the delayed culvert pipe arrived in September.

### Personnel

The Fort Pierre project is being conducted under the general supervision of E. W. Meeker, State Highway Engineer; L. A. Ihli, the District Engineer; and T. J. Bunn, the Resident Engineer. Governor M. Q. Sharpe is Chairman of the South Dakota State Highway Commission.

Whether another contract for crusher-run base-course material and bituminous topping can be let this year is unlikely. It appears now that 1947 will finally see the new high-speed primary transcontinental highway a reality instead of a dream, speeding traffic east and west across the heart of South Dakota.

## No More Tools Lost, Strayed, or Stolen

Small shop tools—hammers, pliers, chisels, and the like—have an annoying habit of wandering away from their proper location. Mechanics pick them up for home use, truck drivers nab them, tools belonging to one department or depot stray to another. All in all, they give the shop superintendent a headache.

The Ideal Industries, Inc., has announced a tool-marking device which, it says will reproduce on metal any mark or line appearing on a stencil film. Known as the E-Z Mark Etcher, it transfers impressions of typewriter, pen, pencil, or stylus from a film stencil to the tool electrically. The stencil can be used over and over again. It is efficient for tools having round as well as flat surfaces.

Ideal Industries, 1366 Park Ave., Sycamore, Ill., will be glad to tell you how this etcher can save your tool-replacement budget, if you mention this news item when you write.

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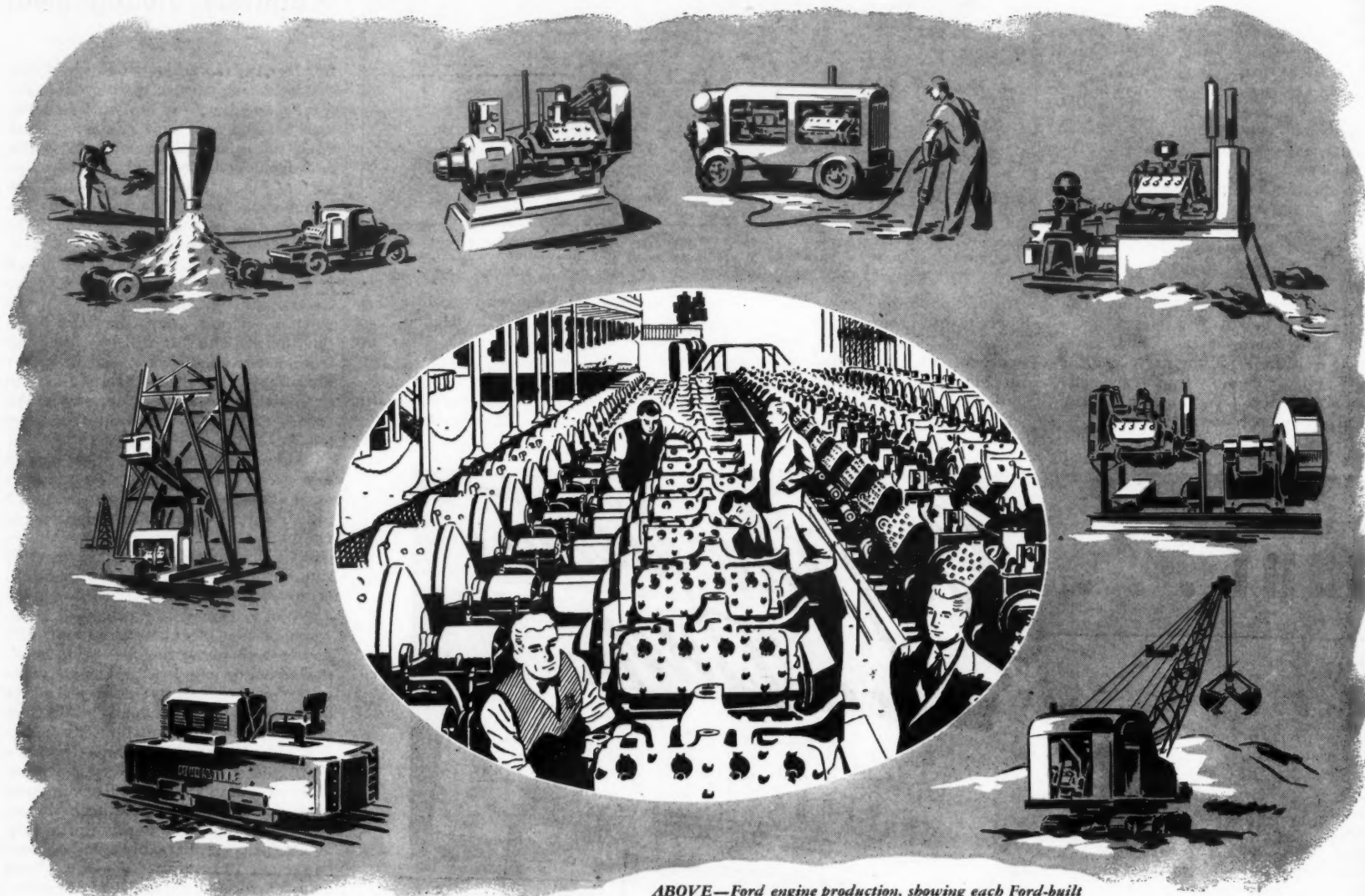
**Model "F"  
Asphalt Plant**

... makes a complete line of portable and stationary batch type and continuous mix type asphalt plants and equipment. For the best asphalt mixing equipment—buy Cedarapids.

COMPANY



# FORD-BUILT ENGINES



ABOVE—Ford engine production, showing each Ford-built engine being individually block-tested as it comes off the line.

## PREFERRED! for the way they're BUILT ... and the way they're SERVICED!

The world-wide demand for Ford-built engines to provide power for industrial equipment is based on very solid values.

Many millions of car and truck owners know, by long personal experience, how excellently Ford engines are engineered, how well they are built, how enduring and reliable and economical they are.

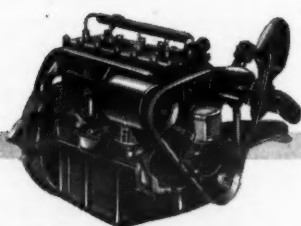
They know, too, that when a man buys Ford-engine-powered machinery, he's assured of authorized Ford Service on the engine almost anywhere he goes. The equipment manufacturer and his distributors, too, are relieved of all concern and expense of maintaining engine parts stocks

and service facilities. That responsibility is gladly and competently shouldered by Ford Dealers and Parts Distributors.

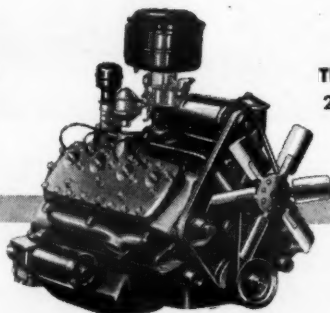
What finer reasons could there be for the choice of any engine?

Ford Motor Company has made available to manufacturers and individuals the three popular engines shown below. You can purchase them, singly or in quantity, through any Ford Dealer or from Ford Motor Company. For detailed specifications and dimensional data, write—

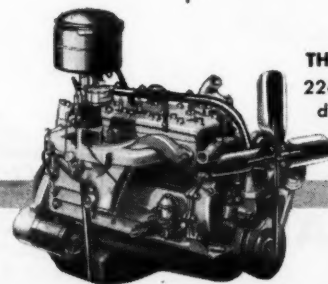
**FORD MOTOR COMPANY**  
Industrial and Marine Engine Department, No. 70  
DEARBORN, MICHIGAN



THE 40-HP FOUR  
119.5 cubic inches  
displacement.



THE 100-HP V-8  
239 cubic inches  
displacement.



THE 90-HP SIX  
226 cubic inches  
displacement.

FOR INDUSTRIAL AND MARINE POWER





Made in 24 and 36-inch sizes, this Lombard chain saw is powered by a 6-hp Homelite engine.

### Gas-Driven Chain Saw In 24, 36-Inch Sizes

A new chain saw powered by a gas-line engine has been put into production by the Lombard Governor Corp., 100 Main St., Ashland, Mass. The saw is being made in 24 and 36-inch sizes, weighing 90 and 95 pounds respectively.

Long life and low upkeep are among the features claimed for the saw by Lombard. The unit is built of magnesium alloy for light weight. The cutting blade swivels to eight different positions. An oiling unit is built into the helper's end to lubricate the chain.

Power for the saw is supplied by a 6-hp 2-cycle Homelite engine, which has a built-in governor and rotary valve, and is supplied by a gas tank that is cast as part of the engine housing.

You can secure full details about the Lombard saw by writing the manufacturer at the above address.

### Only Top-Notch Care Keeps Equipment A-1

Lest anyone in the construction field forget the role that lubrication plays in the success of the industry, we bring to your attention the comments made by *Oilways*, a publication of the Esso Marketeers. An article called "Moving the Earth", in its August issue, reminded readers of some elements essential to keeping equipment in the best of shape.

Earth-moving equipment operates under conditions more severe than those imposed on almost any other type of industrial machinery, the article points out. It must work in high and low temperatures, in dust and dirt, in rain, snow, and dryness.

The loads placed on gears, bearings, cable, and other moving parts may be steady or intermittent, and range from very light to very heavy, including shock loads. Speeds may be as fast as the prime movers can produce. Many earth-moving jobs call for day and night work to meet schedules.

Under such operating conditions, the magazine observes, earth-movers would seem destined for short lives. And they may be, unless the right lubricants are used in the right places at the right time. This means that trained men must be employed to see that these lubrication jobs and others are performed.

Earth-movers should be closely inspected every day to see that abrasive materials are not gaining access to moving parts. Worn parts must be adjusted so that the lubricants in use will be able to fill the spaces between them. Loose parts must be tightened and excessively worn parts replaced before one of them breaks and stops the entire machine.

More important than these precautions, perhaps, are two others, which, if followed, will do much to prolong the life of equipment. Buy the best lubricants available, and entrust the job of applying them to responsible, qualified personnel.

Having the "right man" is a must, because with most earth-moving equipment, lubrication is a full-time proposition. Many parts must be lubricated at frequent intervals. The man must be able to identify the proper lubricant and must know the correct lubricating device to employ. He must be aware of the proper amount of lubricant to use so as to avoid both "drowning" and

under-lubrication.

General instructions on engine lubrication are not of much value, *Oilways* says. Tables which recommend specific lubricants for earth-movers are included in the article. The manufacturer's recommendations should be followed, of course, but if the operator has difficulty getting the most power and best performance from his equipment, a call to his local lubricant distributor will bring quick help.

Roller assemblies in some track-type units cannot be satisfactorily lubricated with asbestos-filled products, heavy oils, or ordinary greases, though these may be used in other designs. Track

rollers, carrier rollers, and front idlers in such units as crawler tractors should be treated with a stringy, tacky product that dispenses easily from a hand gun.

Abrasive particles, chemical action, salt water, and exposure to the elements are constant and recurrent enemies of wire rope, sheaves, pulleys, and chains. Proper lubricants can combat each of these, at the same time protecting the rope, chain, sheaves, and pulleys by keeping out as much foreign matter as possible. External lubrication of such parts is always hampered by abrasive particles. In the case of wire rope, however, good internal lubrication should do much to offset this and bring about

longer life. After the rope has been cleaned and dried, oil that penetrates to the core and provides suitable lubrication for the strands should be applied.

### Conveyor-Belt Fasteners

Flexco HD conveyor-belt fasteners and rip plates and their use are described in a bulletin, F-100, issued by the Flexible Steel Lacing Co. Features of these fasteners are their ease of application, tight joint, and long life, it is stated. You can obtain your copy of the bulletin by writing the firm at 4607 Lexington St., Chicago 44, Ill. Mention this notice.

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3. Western Construction Equip. Co.  
Billings and Missoula, Montana
4. Heiner Equipment & Supply Co.  
501 W. Seventh Street South  
Salt Lake City, Utah
5. Liberty Trucks & Parts Co.  
690 Lincoln Street  
Denver, Colorado
6. Western States Welding & Press Co.  
1304 N. Fourth Street  
Albuquerque, New Mexico
7. Myhra Equipment Company  
1425 Front Street  
Fargo, North Dakota
8. T. S. McShane Co.  
1113 Howard Street  
Omaha, Nebraska
9. Wentz Equipment Co.  
600-08 N. Van Buren St.  
Topeka, Kansas
10. Kessler-Simon Machinery Co.  
601 North Indiana  
Oklahoma City, Oklahoma
11. Malcom Mfg. & Supply Co.  
2601 Butternut Street  
Abilene, Texas
12. Berry Bros. Machinery & Repair  
Works  
378 Industrial Boulevard  
Dallas, Texas
13. Bill Goodwin Machinery Co.  
66 Highway South & Military Dr.  
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14. South Texas Equipment Co., Inc.  
6 N. Latham St.  
Houston, Texas
15. The George T. Ryan Co.  
3000 University Avenue S. E.  
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16. Barton-Stephens & Company  
Sioux City and Des Moines, Iowa
17. Contractors Supply Company  
1712 Main Street  
Kansas City, Missouri
18. Oklahoma Road Machinery Co.  
1200 South Cherokee Street  
Muskogee, Oklahoma
19. R. A. Young & Son  
301 South Tenth Street  
Forth Smith, Arkansas
20. Boyce-Curran Machinery, Inc.  
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Baton Rouge, Louisiana
21. Miller, Bradford & Risberg Co.  
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Eau Claire, Wisconsin
22. Clem Fleury Equipment Co.  
Cedar Rapids and Waterloo, Iowa
23. The Geo. F. Smith Company, Inc.  
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24. Priestner Machinery Company  
122 South Third Street  
Memphis, Tennessee
25. Jackson Road Equipment Co.  
842 S. Commerce Street  
Jackson, Mississippi
26. The Stone Manufacturing Co.  
321 North 25th Street  
Milwaukee, Wisconsin
27. Great Lakes Supply Corp.  
1026 W. 50th Street  
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28. Eighth Equipment Co.  
526 W. State Street  
Rockford, Illinois
29. Korte Bros., Inc.  
219 W. Main Street  
Fort Wayne, Indiana
30. Manwaring Machinery Co., Inc.  
6 N. 29th Street  
Indianapolis, Indiana
31. Metal Manufacturing Corporation  
30th & Garland  
Louisville, Kentucky
32. Buchanan-Rooney Equipment Co.  
Box 1274  
Nashville, Tennessee
33. Leary & Owens Machinery Co., Inc.  
3600 Fifth Avenue, North  
Birmingham, Alabama
34. Telford Equipment Company  
319 East North Street  
Lansing, Michigan
35. Cantwell Machinery Co.  
830 N. Cassady Avenue  
Columbus, Ohio
36. The Bode-Finn Co.  
Cincinnati and Dayton, Ohio
37. H. Wetherald Equipment Co.  
300 East Amherst Street  
Buffalo, New York
38. Anderson Equipment Co.  
P. O. Box 1737  
Pittsburgh, Pa.
39. Persingers, Incorporated  
313 Jefferson Ave.  
Charleston, W. Va.
40. Highway Mach & Supply Co., Inc.  
1724 Altamont Avenue  
Richmond, Virginia
41. Mitchell Distributing Co., Inc.  
Spruce Pine and Raleigh, N. C.
42. State Machinery and Supply Co.  
2204 Main Street  
Columbia, South Carolina
43. Al Schlosser Equipment Co.  
1318 E. Ponce de Leon Ave.  
Decatur, Georgia
44. Credle Equipment Co.  
309 North Genesee Street  
Utica, New York
45. Ensminger & Company  
57 Wood Street  
Wilkes-Barre, Pa.
46. American Equipment Corporation  
York & Allen Streets  
Mechanicsburg, Pennsylvania
47. The Chesapeake Supply & Equip. Co.  
1211 E. 25th Street  
Baltimore, Maryland
48. Slade Tractor Co., Inc.  
924 Broadway  
Albany, New York
49. E. H. Kliebenstein Co.  
1099 Hendricks Causeway  
Ridgefield, New Jersey
50. Curry Equipment Corporation  
3132 W. Thompson St.  
Philadelphia, Pa.
51. Murray Machinery Co.  
Augusta, Me., Concord, N. H.,  
Montpelier, Vt.
52. H. F. Davis Tractor Company  
Boston, Worcester and Holyoke,  
Mass.
53. R. W. Bleiler Equipment Co., Inc.  
1031 New Britain Avenue  
West Hartford, Connecticut
54. Consolidated Equipment & Supply  
Co., Ltd.  
475 Howe Street  
Vancouver, B. C.
55. Wilkinson & McClean, Limited  
Edmonton, Calgary & Lethbridge,  
Alberta
56. I. J. Houg & Sons, Ltd.  
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464 Queen Street East  
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C. &amp; E. M. Photo

At the Rhode Island Materials Testing Laboratory, an operator measures the penetration of an asphalt on this Precision penetrometer. He checks by the stop watch at his left the time interval of the needle's passage into the bitumen.

## Materials Tested For Use in Roads

**Trained Men and Modern Apparatus Work in State Laboratory to Assure Best Grade of Materials**

† THE Materials Testing Laboratory of the Rhode Island Department of Public Works, Division of Roads and Bridges, is located in the basement of the State Office Building, just across Smith Street from the State Capitol in Providence. Here are tested all materials that go into the construction and maintenance of highways, in order that the quality of the sand, stone, cement, steel, bitumen, etc., used in this work conform to the requirements laid down in the specifications. The laboratory consists of five rooms where tests are run, a moist room, and another room for the storage of material and equipment.

The work is carried on by a staff of sixteen, headed by a Materials Engineer and an Assistant Materials Engineer. A Senior Materials Inspector handles the laboratory records; with four Materials Inspectors, he also performs physical tests on all aggregate and tests concrete beams and cylinders. The aggregate includes all types, such as sand, stone, gravel, etc., used in either concrete or bituminous pavements. One Senior Materials Chemist and two Materials Chemists test bituminous products—the tars, asphalts, and their derivatives—together with such varied materials as corrugated-metal pipe, road joints, coal, gasoline, oil, etc. Working for the laboratory but not always in it are three Senior Materials Plant Inspectors and three Materials Plant Inspectors. They may be assigned to aggregate-producing, concrete, or asphalt plants, either commercial or contractor-operated, to see that the required standards are maintained both as to quality and quantity of materials being produced or processed.

### Receiving Room

The wings of the laboratory surround a courtyard opening on the street. Here trucks can enter to unload samples directly at the lab entrance. Heavy pieces are handled easily by means of an outrigger beam and chain, fall above the door. The yard is also useful for storing concrete test beams, but is nearly empty of these right now; the last concrete pavement constructed in Rhode Island was back in 1941. Each day on a concrete job, six test cylinders and beams are poured. These are permitted to harden in the ground before being brought to the laboratory for physical testing. Specimens which are to be tested at the end of 7 and 28-day periods are left in the ground for two

days. The others are left there for two weeks, and are then brought to the laboratory where they are tested after 6-month, 1-year, 3-year, and 5-year periods.

All samples are brought to a 20 x 35-foot receiving room where they are tagged with a serial number; pertinent data describing them are entered in a record book. While this is being done, the samples are placed on a 4 x 12-foot table whose soapstone top is easy to clean and also acid-resisting. This room contains a set of glass tubes for testing the capillarity of soils, and an International centrifuge which is used for drying material samples.

On a long table at one side of the room is a row of 12 Pyrex vessels and fittings known as the hot-extraction apparatus. This removes the bitumen from a bituminous mix so that the percentage of tar or asphalt therein can be determined. With the exception of the 11 x 9-inch-diameter cylindrical Pyrex jars, the equipment was built by the laboratory staff and patterned after the



C. &amp; E. M. Photo

In order to determine their gradation, sand samples in sieves are placed in the laboratory's soundproof cabinet which houses a Tyler R-Tap electrical sieving machine.

method used by a local asphalt com-

pany. A 500-gram sample of the bituminous material is first carefully weighed. Then it is put on filter paper and placed at the bottom of the Pyrex vessel within a 1/8-inch-wire-mesh cylindrical container. Beneath the vessel is a gas burner; at the top are a couple of tubes through which water enters and then leaves the extractor after passing through a condenser coil. Benzol is used as a solvent for the bitumen, since it (1) has a low boiling point, 80.1 degrees C, (2) is considered safer than carbon disulphide which is more inflammable, and (3) does not disintegrate filter paper as carbon tetrachloride does.

Very little attention is required with this hot-extraction method. The sample is covered with the solvent, which boils quickly over the flame, rises as a vapor to the top of the vessel where it is condensed on the cold-water coils, and drops back down on the bituminous mix. The heated solvent dissolves out the bitumen so that it passes through

(Continued on next page)

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C. & E. M. Photo  
For a freeze-thaw test, frozen concrete beams are thawed out in a Blodgett cabinet oven at a 250-degree-F temperature, thermostatically controlled.

## Materials Testing

(Continued from preceding page)

the filter paper, leaving behind the clear sand and stone of the mix. The residue is then weighed and the percentage of bitumen in the mix is determined. This extraction method takes a day. But as it practically runs itself and a sample can be analyzed in each of the twelve extractors, the apparatus has proved very useful to the laboratory. When compared with similar samples extracted by the cold method, the results have been identical.

One of the most important functions of a modern laboratory is the precise weighing of minute particles of various kinds of materials. In a small 6 x 10-foot cubicle off the receiving room, infinitesimal fragments are weighed on a Christian Becker analytical balance which can record to 1/1000 gram. To make such refinements possible and consistent, the laboratory staff removed a section of the floor and the foundation beneath; they then constructed a 5-foot-deep concrete footing entirely independent of the rest of the building. In this foundation they embedded three 3 1/2-inch round pipes which were then filled with concrete. To their tops they bolted a 54 x 18 x 3 1/2-inch-deep concrete slab for a table top to support the balance. Thus jars within the building, from the elevators or other sources, have no effect on the delicate balance.

The technician works alone in this room, which is equipped with a thermometer and relative-humidity gage, and handles the stainless-steel weights with tweezers. The sample being weighed on the other side of the balance is contained in a Selas crucible, and the weight in grams is recorded to four decimal places. The elevation 78.83 above mean sea level is inscribed on the table top, and this fact is also considered as a further refinement in precision weighing.

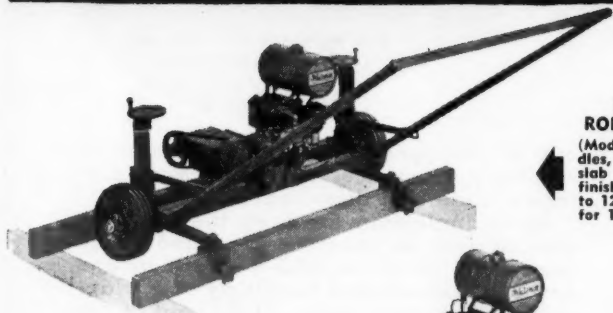
### Bituminous Laboratory

Off the receiving room is the 20 x 40-foot bituminous laboratory where such samples are analyzed and tested. In one corner is a mechanical cold extractor for removing the bitumen from asphaltic or tar mixes. A 500-gram sample of the mix is heated and weighed. It is then placed in a bowl which is fitted onto the shaft of the extracting apparatus. The bowl is covered with a lid that has a hole at the center; through this hole the carbon tetrachloride solvent is added to overflowing. Then the switch is thrown and the machine spins around at high speed while the solvent, turned black by the bitumen, is discharged at the side. More and more carbon tetrachloride is added until the discharge finally runs out clean, indicating that the bitumen has been completely extracted from the mixture. This generally takes about 20 minutes. The residue is not weighed, however, until 10 hours later when the moisture has all evaporated. A hood with an exhaust fan withdraws the fumes as they rise from the apparatus. The carbon tetrachloride is later reclaimed by distilling.

As a safety precaution, all tests in this room which involve the use of a flame are surrounded by galvanized-metal shields set up on the tables. Other apparatus in the bituminous lab includes two thermostatically controlled electric ovens, a Precision Scientific Co. and a Freas, for drying samples before and after tests. On one of the tables a piece of apparatus tests the ductility of bitumens; while another piece of equipment, a Tag-Saybolt thermostatic viscosimeter, determines the viscosity of oils, tars, asphalts, etc. The penetration of asphalts is arrived at on a Precision penetrometer, with the technician checking by a stop watch the time interval of the passage of the needle into

(Continued on next page)

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C. &amp; E. M. Photo

A technician mixes previously tested lab cement with Ottawa sand in order to obtain a standard briquette against which samples can be checked on the breaking machine.

## Materials Testing

(Continued from preceding page)

the bitumen.

### Sand and Soil Laboratory

On the other side of the receiving room is the L-shaped sand and soil laboratory, 40 feet on the long side, 25 on the other leg, and both 25 feet wide. Each day when concrete is being poured on a construction job, samples of the cement and sand are taken and brought to the laboratory. The cement is brought in tin cans and the sand in double paper bags with a waterproof wax lining to prevent their cracking open. They are given consecutive numbers to insure proper pairing if mortar tests are run. The bags have already been stamped in the field and the following information written on them: contract number, name of material and the producer, the date, from what source taken, and the quantity that the sample represents. These data are transferred to the record book. The sample bags are also stamped with a form called "Record of Test", with information to be filled in covering: elutriation, sieve gradation, color as determined by a colorimeter, and briquettes which disclose the soundness and consistency of the mortar.

The cement goes to one bench where tests are run for fineness, consistency, time of set, and soundness.

The sand is put through a riffle, which splits the sample up so that its consistency is the same throughout. A 500-gram specimen is taken for the elutriation test, a decanting operation in which the material in suspension is poured off, weighed, dried, then weighed again, to determine the amount of silt contained in the sand. Sand for concrete may not contain more than 3 per cent silt.

Another 500-gram sample is spread out in a Wearever aluminum pan and dried in an oven. It is then placed on a No. 4 sieve, the top of a series of Precision Scientific Co. sieves, with the No. 10 immediately below and followed in order by the others up to and including the No. 200. All material passing the No. 4, a 1/4-inch sieve, is considered sand. The sieves are then placed in a soundproof cabinet which houses a Tyler Ro-Tap electrical sieving machine operated by a 1/2-hp motor; there they are vibrated for 5 minutes. At the end of that time the sand has been graded over the various sieves and the percentage by weights passing each is determined.

For the colorimetric test, 4 1/2 ounces of sand is placed in a bottle which is then filled to the 7-ounce mark with a 2 per cent solution of sodium hydroxide. The bottle is closed with a rubber cork, shaken vigorously, and left to stand for 24 hours. The color of the solution is then compared with a standard bottle known as No. 2 color, an amber shade. If the sample is darker than the standard, it indicates that the organic content

of the sand is too high. Both the gradation and the color tests are also performed in the field by inspectors as a double check on the sample. Rhode Island has over 2,300 sand pits which have been tested and approved, with a data history of each on file in the laboratory.

For the briquette test on the mortar, an 800-gram sample is taken on a tray and allowed to dry out over night so that 750 grams are available in the morning. All of this specimen must pass the No. 4 sieve; it is then air-dried. Next the sand is mixed with laboratory-tested cement to form a 1 to 3 mortar, with water being added in calibrated amounts. The mix is moulded into briquettes and allowed to harden. After 7 and 28 days the briquettes are broken in a Tinius Olsen briquette-breaking machine. Tensile strength is determined by comparing the weight of the shot that is necessary to break the sample, with the strength of a standard briquette made with Ottawa sand.

Ottawa sand, a hard silica variety

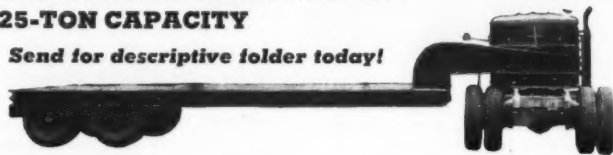
from Illinois, passes the No. 20 mesh sieve but is retained on the No. 30; it is considered a yardstick in these analyses. The sample briquette must break at the same point or better than the standard model. The standard is also a 1 to 3 mortar for which the cement and

sand are mixed dry for 30 seconds, by a technician using rubber gloves; afterwards a calibrated amount of water is added and the mixing continues for another 1 1/2 minutes. The mortar is then placed in a standard 3-gang collapsible (Concluded on next page)

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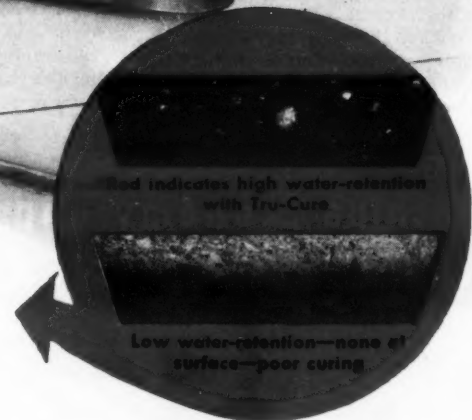
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Laboratory tests show 98% water-retention with Tru-Cure during the most critical curing period. The fast drying Tru-Cure film permits immediate spreading of straw or hay as frost protection on the slab. It protects concrete from defacing marks of weighted hay or straw. In the meantime there has been no "wicking" of the water

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out of the concrete and no exposure to vegetable substances that can cause surface scaling and discoloration.

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## Materials Testing

(Continued from preceding page)

bronze mold set on a piece of plate glass and allowed to harden. The molds are placed in the moist room for curing and are broken after 7 and 28 days.

Materials used in these tests are weighed on a Toledo springless scale and dried in a Blodgett cabinet oven. This oven is also used in freeze-thaw tests for concrete when frozen concrete beams, measuring  $8\frac{3}{4} \times 2\frac{1}{4} \times 3$  inches, are thawed out at a thermostatically controlled temperature of 250 degrees F. Bulk materials, such as cement and Ottawa sand, are kept in Witt corrugated-metal cans which are set on roller platforms for easy handling around the room.

Off this lab on one side is a large storage room equipped with metal shelves for samples of materials and equipment used in making tests in the field. Adjoining it on another side is a 21-foot-square moist room. This is outfitted with a two-nozzle spray controlled by a Powers mixing valve, which admits hot or cold water in a spray over the floor area where the concrete specimens are cured. The temperature of this room is regulated from the outside where a thermometer is hung indicating the temperature on the inside.

### Concrete-Test Room

In a 30 x 50-foot room, large enough to accommodate the storage of samples, concrete beams and cylinders are broken to determine their strength at definite intervals. The character of each break is analyzed as to whether it is across the aggregate, around the aggregate, or a combination of the two. The compressive strength of concrete cylinders, 12 x 6-inch diameter, is determined by crushing them on a Southwark-Emery Universal testing machine; it is capable of exerting a pressure of 10,612 pounds to the square inch, far in excess of an average 6,250 pounds needed to break one of the 30-pound cylinders at the end of a 5-year period. This machine, operating on the hydraulic principle, is also used to break steel reinforcing rods up to a 1-inch size. The flexural strength of the 6 x 6 x 30-inch beams is determined on another type of beam-breaking machine which can break the beam at either one or two places. A Chatillon dynamometer records the modulus of rupture.

This room also contains a Blystone  $\frac{1}{2}$ -bag concrete mixer run by an electric motor. It is used to make concrete beams and cylinders with aggregate from newly opened sources of supply. The gears on the mixer are of fiber construction for quiet operation. Other apparatus includes a Tinius Olsen flow table used in consistency tests for the water-cement ratio, and a Universal stone grader—a machine with vibrating screens for sorting stone or gravel from  $\frac{1}{4}$  up to  $2\frac{1}{2}$  inches in size. Here also is kept a lathe with a 6-inch swing and  $3\frac{1}{2}$ -foot bed.

### Stone Test Room

Stone and gravel are tested for abrasion loss in a 20-foot-square room equipped with a Deval abrasion machine and a Los Angeles rattler. The latter is a drumlike machine in which stone is placed and then revolved for 100 or 500 times, depending on the nature of the test. Steel balls are added to the drum in some cases. The Deval machine is cylindrical in shape and is

generally used in testing the loss from abrasion in gravel. The sample is placed in the cylinder along with 6 balls weighing between 390 and 445 grams each and revolved 10,000 times; this takes about 5 hours. The gravel is washed, oven-dried, and weighed again on a Toledo scale to determine how much was lost through the abrasive action.

### Personnel

Anthony R. Healy is Materials Engineer in charge of all laboratory operations, and John H. Byrne is Assistant Materials Engineer. George H. Henderson is Principal Highway Engineer for the Rhode Island Department of Public Works, Division of Roads and Bridges, and H. C. Thierfelder is Senior Highway Engineer.

### Serves Galion in NW

The Galion Iron Works & Mfg. Co. has named James M. Borrer, former Army Engineer, as its northwest dis-



The first bulldozer made by Caterpillar is owned by Lee Osborne, contractor of Muscatine, Iowa. This straight-edge No. 7S is here being used in levee building, but has also seen service in land clearing and farm-pond building, as well as in road work.

trict representative. He will represent Galion in Washington, Oregon, Idaho, Montana, and Wyoming.

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## Ohio "Reserves" Land For Future Highways

**State Pays \$5 an Acre to Reserve Land Parcels Which Owners Can Use Until Needed; Permanent Building Or Planting on Them Not Allowed**

THE Ohio Department of Highways is experimenting with a new technique of acquiring lands for highway purposes, reports David R. Levin, Chairman of the Committee on Land Acquisition of the Highway Research Board. The new technique is described as follows.

When it has on record the plan for a future highway, the State, for a nominal consideration, makes "highway reservation agreements" with land owners who are involved. By the terms of this agreement, the land owner continues to use the property until the State is ready to build its highway. But he agrees not to construct or permit to be constructed within the reserved area any structure that cannot be removed within ten days without cost to the State. He also agrees not to make any permanent plantings, such as orchards, which will interfere with the ultimate use of the land for highway purposes. The Director of Highways in turn retains the right to cancel any such agreement should highway plans change in the future.

By this new instrument of land acquisition, the State hopes to conserve its funds. It hopes to eliminate expensive building, public-utility, and other rearrangement costs.

A 4-mile section of the Columbus-Wooster Road in Delaware County served as pilot application of the new idea. This county had proved to be one of the most difficult Ohio counties in which to obtain right-of-way. This section of road is part of a planned Cincinnati-Cleveland express highway; portions of it will have limited access.

By May, 1946, the State had executed highway reservation agreements with owners of 21 of the 22 parcels involved in the section. The remaining owner had no apparent objection to the reservation of his land for future highway use; but he did desire access to the highway at a place where the design permitted none. On the whole, it appeared that land owners are often more willing to grant a reservation easement than to execute an agreement to sell the customary highway easement at a price that may prove inadequate at the time of acquisition.

### Costs

Compensation for the reserved areas is at the rate of \$5 per acre or portion thereof. Thus far, \$421 has been paid for 21 reservations covering 3.85 miles of road, a rate of \$109.35 per mile. This is an amazingly low price for the type of protection granted, and compares favorably with the cost per pole of a power or telephone easement in Ohio.

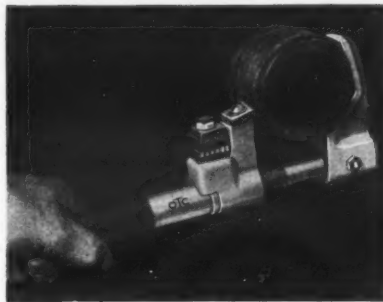
Ohio highway authorities estimate that the average state investment will range from \$60 to \$120 per mile, de-

pending on the width of the right-of-way and the area protected. This is roughly equivalent to the cost of removing an average signboard or small structure.

### Legal Aspects

As a legal basis for acquiring these special rights, the Ohio Department proceeds on a simple understanding. Where an ultimate highway plan is on record, the State is presumed, under Section 1178-2 of the Statutes of Ohio, to have the right to acquire property and property rights pursuant to that plan. On such grounds, the Department takes its action without seeking special legislation or using condemnatory powers.

All legal instruments in the reservation transaction are recorded in the customary manner. Restrictions are deemed to run with the land, and are thus binding on all subsequent holders and grantees. Mortgage holders and other equity owners join in the execution of the agreements.



The OTC No. 897 Outside Thread Chaser is designed to restore damaged threads on housings and other parts.

### Thread Restorer

The Owatonna Tool Co. has announced a handy gadget to have around the shop, where threads on axles, parts, and pipes have become worn or damaged. Known as the Outside Thread Chaser, the tool is said to restore battered threads with ease.

Capable of handling 1 to 5-inch diameters, the tool is quickly adjusted to

the desired size. Applied on the good threads, it is tightened slightly before being backed off the pipe over the damaged threads. The process is repeated with increased pressure until the damaged threads are recut.

Full information about the OTC No. 897 can be secured from the Owatonna Tool Co., 348 Cedar St., Owatonna, Mich. Just mention this notice in CONTRACTORS AND ENGINEERS MONTHLY.

### Small Versatile Trencher

A versatile trencher, the Model 110, is shown by The Cleveland Trencher Co. in an 8-page bulletin. The unit has a maximum 2-foot cutting width, and a minimum of 11 inches. It has a 5½-foot digging depth. Action photographs, diagrams, and pictures of the various elements of the trencher are shown, together with complete specifications.

Copies of Bulletin S-50 will be sent, on request to The Cleveland Trencher Co., 20100 St. Clair Ave., Cleveland 17, Ohio.

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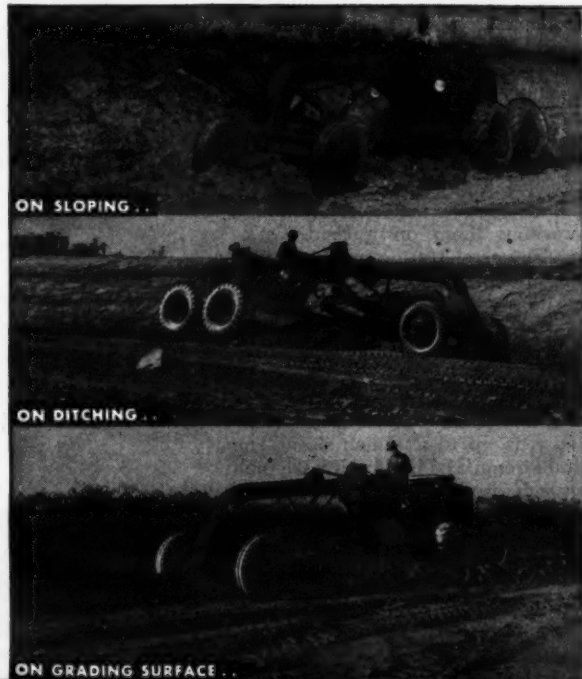
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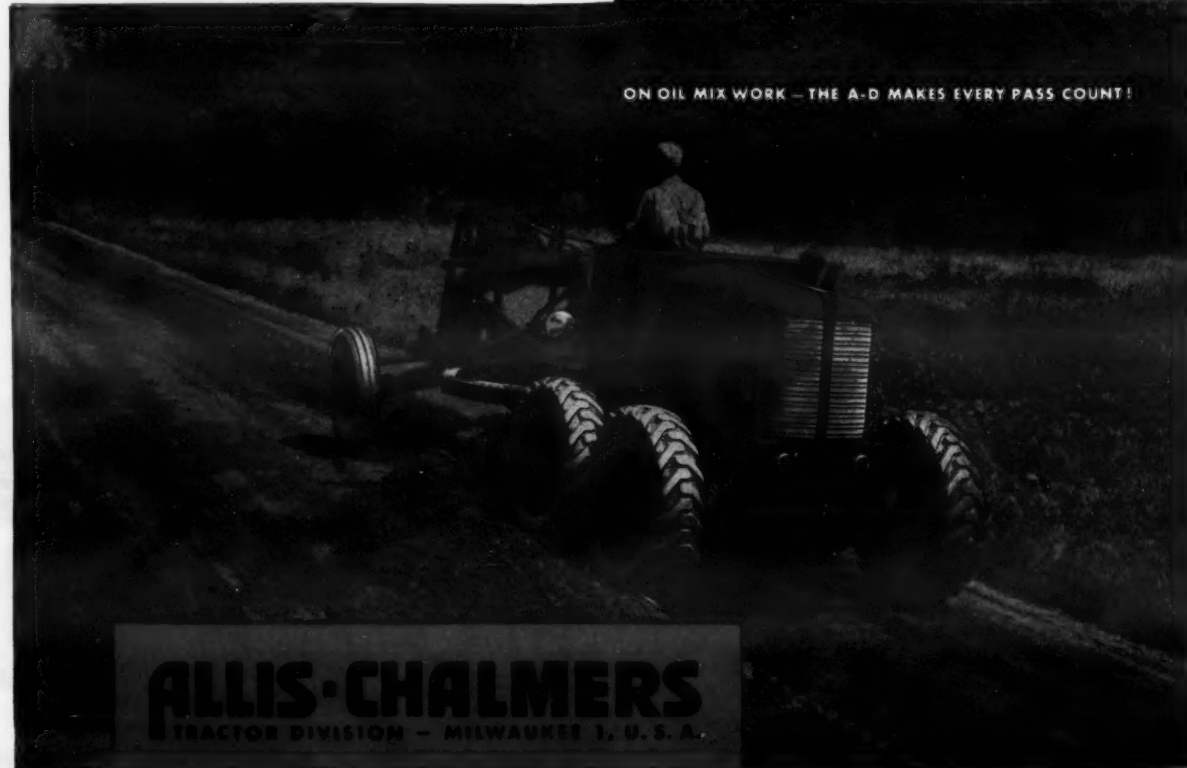
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**Preformed Wire Rope****Surveyed in Booklet**

The role played by preformed wire rope is reviewed in a new booklet issued by the Preformed Wire Rope Information Bureau for the benefit of construction personnel. Introduced in 1924, this type of wire rope has become extremely popular, and now represents nearly half the nation's wire-rope production.

Many people in the construction field use preformed wire rope daily, yet are

unaware of its peculiar characteristics, the Information Bureau believes. For this reason, the 24-page booklet surveys the differences between plain wire rope and the newer type, stressing the advantages claimed for the latter.

To learn the advantages preformed wire rope is said to give both worker and management, send for a copy of the booklet, "Preformed Wire Rope—What It Is; What It Does". Write the Preformed Wire Rope Information Bureau, 520 No. Michigan Ave., Chicago 11, Ill., and mention this notice.

**Mid-Atlantic FWD Dealers**

Three new distributors for FWD trucks have been named to serve the east, the Four Wheel Drive Auto Co. has announced.

Sales in Pittsburgh and Allegheny County, Pa., are to be handled by Norman Joyce Kilmer, Frick Bldg., Pittsburgh. The United Equipment Associates, South Williamsport, Pa., will distribute FWD's in Tioga, Lycoming, Union, Snyder, Montour, and Northumberland Counties.

The American Air Compressor Corp., North Bergen, N. J., will serve as FWD dealer for the state of New Jersey.

**Rubber Goods for Dredges**

Dredging contractors will be interested in a catalog section issued by the B. F. Goodrich Co. to describe its Armorite dredge sleeves for flexible connections on discharge pipe lines, and its Akron suction hose. Write Goodrich at Akron, Ohio, and ask for catalog section No. 3700 as described in this news item.

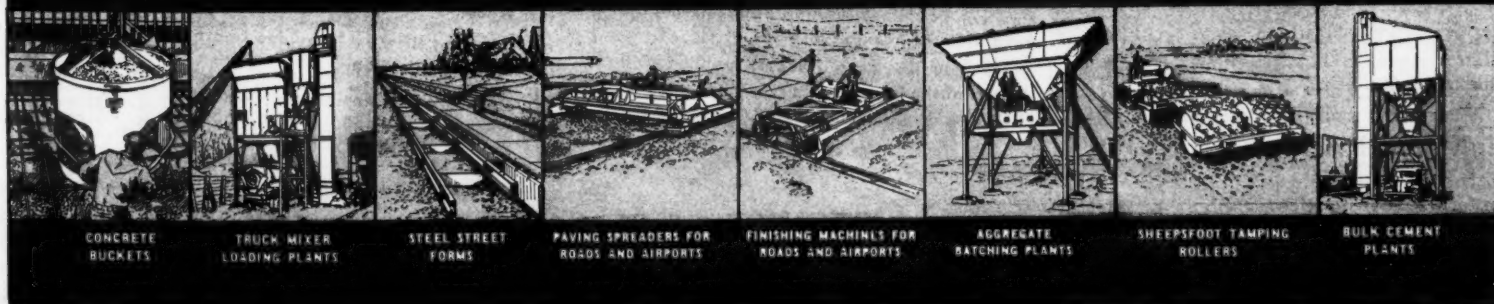
# You always get BLUE RIBBON PERFORMANCE WITH BLAW-KNOX BUCKETS

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## Convention Calendar

**Dec. 5-8, 1946—Highway Research Board**  
Annual meeting, National Academy of Sciences and National Research Council Bldg., Washington, D. C. Roy W. Crum, Director, 2101 Constitution Ave., Washington 25, D. C.

**Dec. 17-20, 1946—AASHO**  
Annual meeting, American Association of State Highway Officials, Biltmore Hotel, Los Angeles, Calif. Hal H. Hale, Executive Secretary, 1220 National Press Bldg., Washington 4, D. C.

**Jan. 27-30, 1947—AGC**  
Annual convention, Associated General Contractors of America, Stevens Hotel, Chicago. H. E. Foreman, Managing Director, Munsey Bldg., Washington 4, D. C.

**Feb. 13-16, 1947—AED**  
Annual meeting, Associated Equipment Distributors, Edgewater Beach Hotel, Chicago. C. F. Winchester, Executive Secretary, 1928 Eye St., N.W., Washington, D. C.

**Feb. 17-20, 1947—ARBA**  
Annual convention, American Road Builders' Association, Palmer House, Chicago. Charles M. Upham, Engineer-Director, International Bldg., Washington 4, D. C.

**Feb. 24-26, 1947—ASTM**  
Spring meeting, American Society for Testing Materials, Benjamin Franklin Hotel, Philadelphia. C. L. Warwick, Executive Secretary, 1916 Race St., Philadelphia 3, Pa.

## Court OK's Cement Marketing Procedure

The use by cement firms of the multiple basing point system of marketing was approved in a U. S. Court of Appeals decision rendered recently at Chicago. The ruling vacated a ban placed on the sales procedure by the Federal Trade Commission.

In effect, the decision permits the cement companies to continue to sell cement at delivered prices under a multiple basing point method if they so choose. FTC had charged that this system amounted to a conspiracy in the quoting of cement prices.

The Trade Commission's ban was ordered in July, 1943, after hearings that covered three years and rang up more than 100,000 pages of testimony. The complaint had originally been filed against 75 cement companies and the Cement Institute in 1937.

In the opinion of the court, the basing point price system has been in use by American industry for many years and any ban on its use should rise from Congress, not from the judiciary. It termed the alternative method which the FTC would effect, an f.o.b. plant basis, a case of "jumping from the frying pan into the fire".

The decision was hailed by Major General William J. Donovan, counsel for the Cement Institute and several of the manufacturers, as a victory for marketing methods long used by most heavy-goods industries.

## Agricultural Land Leveling

A new and almost untapped field of endeavor for earth-moving contractors—the leveling of agricultural land—is highlighted by R. G. LeTourneau, Inc., in a new bulletin. Economies possible with the Tournapull are permitting the leveling of farm sites once deemed too expensive to level, the 4-page leaflet says. It pictures and describes several such jobs, and gives ten reasons for the adaptability of Tournapulls to this type of work.

Write R. G. LeTourneau, Inc., at Peoria, Ill., for copies of Form G-1077, the "Landleveling Bulletin".

## High-Nickel Alloys

How to choose metal wire, strip, or rod of uniform dimensions for use in applications that require high temperature and corrosion resistance is discussed in a booklet issued by the Alloy Metal Wire Co. Engineering informa-

tion is given on the properties of various alloys having a high nickel content. Sizes, weights, tolerances, and other data on Alloy products are listed in the 24 pages.

To secure copies of this engineering booklet, write Alloy at Prospect Park,

Pa., using your business letterhead, and mention this notice.

## Rubber-Products Booklet

Outstanding construction projects on which Manhattan belting and hose have

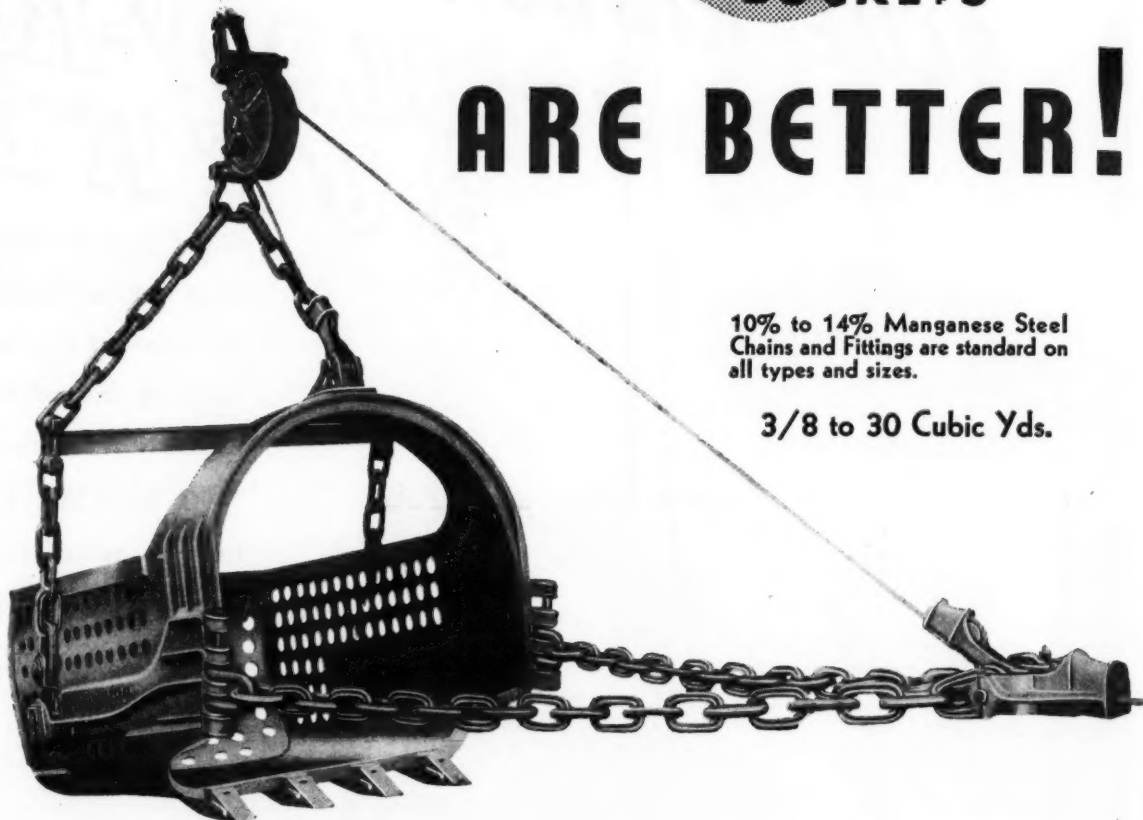
been used are illustrated in a pictorial bulletin, "Manhattan Rubber Products for Contractors", just issued by Raybestos-Manhattan, Inc. You can obtain a copy of Bulletin 8688 from the Manhattan Rubber Div., Passaic, New Jersey.

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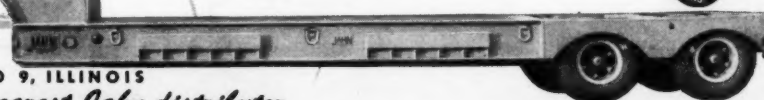
- 4 Worm gear type slack adjusters at each wheel.
- 5 Constant lift cam provides improved brake application.
- 6 Exclusive axle designs furnish ample oscillation for equal load distribution on all tires.



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# River Helps to Reclaim Waste Lowland Areas

**Tamed and Subdued, the Ulua River in Honduras Is Rebuilding Thousands Of Ravaged Acres**

By HOWARD V. PEHRSON,  
Field Editor

ENGINEERING history is being written in the once tangled jungle lowlands of the Sula Valley on the north coast of Honduras. There the Ulua River for centuries has been pouring over its banks to spill ravaging floodwaters relentlessly on thousands of acres of fertile soil. But today, this notoriously "bad" river, subdued and tamed, rebuilds the land it formerly despoiled.

For uncounted centuries, the Ulua was defiantly violent. In spring and autumn the river, swollen with tropical rains, would surge angrily over its banks through the lush little valley, leaving in its wake a wide path of destruction from the foothills to the sea. But today, the river is giving up what the river once took away. In the Sula Valley, which is only 10 to 20 kilometers wide and 115 kilometers long, more than 30,000 acres of some of the richest soil in the world has already been reclaimed from tepid swamps and marshes. This is only the beginning. Engineers envisage eventual reclamation of more than 100,000 waste acres in Honduras from a continuing process of wringing rich loam and mud from the Ulua before it discharges into the ocean.

What is happening in Honduras could happen in many other countries where mighty rivers now wreak annual havoc on river dwellers and planters. In the United States, similar reclamation of vastly productive farmland could be undertaken in the bottom land of the Mississippi. Savage and malevolent as flooded rivers may be, they can be tamed and put to work. Instead of fearsome things against which great levees and floodwalls must be erected for protection, rivers can be made the friends and benefactors of those who live and plant in their valleys.

## How It Started

The story of the taming of the Ulua in Honduras and the harnessing of its vast land-building powers goes back for almost half a century. Little Honduras was then one of the least known Central American countries. Newspapers of the day were chiefly concerned with the border disputes and revolutions which repeatedly exploded in the troubled state. But a growing world appetite for bananas, and the ideal soil and climatic conditions in this tropical republic, had attracted a handful of business interests, notably the United Fruit Co. and the Cuyamel Fruit Co.

In 1913, Samuel Zemurray, President of the fledgling Cuyamel firm, hired a young engineer from Lafayette, Ga., as an instrument man to assist in laying out new banana blocks in the jungles along the west bank of the Ulua.

Twenty-seven-year-old Patrick H. Myers, with an '09 C.E. sheepskin from Georgia Tech, four years of experience with railroad survey and construction crews in Georgia, Alabama, and Florida, and unbounded determination to prove his ability, had responded to the call of the tropics. He was a pleasant chap with a great mop of brown hair and flashing brown eyes that twinkled when a frequent smile came to his lips. Any idea that he was easygoing or happy-go-lucky, however, was quickly dispelled by a look at his stubborn chin; it seemed as hard as rock when his teeth clamped down on his pipestem and he set to work on a particularly knotty problem.

It was a far cry in those days from the scientific methods which character-



Once hand labor was used to cut the first experimental "boquerones" into the lowlands. Now heavy equipment is used—such as this Bucyrus-Erie dragline, which stands by while stumps are dynamited along a drainage canal.

ize banana planting today. The steam-

ing jungle was blocked off into 25-acre sections; machete-swinging natives cleared away the thickly intertwined undergrowth; and the banana plants were simply hilled up. Although at first, heavy growth was felled and left on the ground to rot, within a few years the banana planters started burning off the land.

Pat Myers plunged into the jungles with his transit and machete. His zeal, copious sweat, and valuable suggestions did not go unnoticed by the astute Mr. Zemurray and within four years, the young engineer from Georgia was Cuyamel's Chief Engineer.

During his first years in the Sula Valley, Pat Myers' chief concern was to build levees which would protect river-side plantations and to excavate drainage ditches through the lowlands which would carry off standing water. He put his railroad experience to good account as 42-inch-gage main lines and spur tracks were laid up the river and back to the plantations. He watched

(Continued on next page)

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## River Helps to Reclaim Waste Lowland Areas

(Continued from preceding page)

with no little pride as the jungles receded a bit and fresh new houses, warehouses, and sheds began to appear on the narrow strip of banana land on the river banks.

### River Studies

But the natives and the first planters were frightened by the Ulua River. Their efforts, the earth bulwarks which they toiled to raise as protective barriers against the terrible giant, seemed so puny and ineffectual. The river was the greatest force in the valley and no matter how they struggled against it, they were still apprehensive.

So it was altogether natural that during the first years Pat Myers spent in Honduras, he should give a good deal of observation and study to the Ulua. With very little in engineering books to guide him and less in tangible experiments, the young engineer began gathering a lot of information and data without, at first, knowing where it all was leading.

Many of the studies which he and his assistants made in those days were crude, but the results were sometimes amazing and suggested a possible future path to follow which would lead from waste swampland to fertile new farmland. The waters of the Ulua were high in sediment, the engineers found. They dipped bucketfuls of the muddy waters at every season of the year and studied the silt which settled in the pails. The deposits varied in quantity, but did not change in type. The sediment was not a coarse sand, but a rich clay loam. At some seasons of the year, the river waters carried up to 1 per cent silt.

Refinements of the original "bucket" method of determining sedimentation revealed that at high water, the Ulua carried about 1/32 inch of silt per square foot of land surface per cubic foot of water. Since the river has a discharge of about 550,000,000 cubic feet of water a year, the engineers estimated that the waters carried a year-around average of 137 parts of silt per 100,000 of water by weight. This meant that every year the ravaging and de-



Once a right-of-way in the jungle has been cleared, construction of a drainage canal follows closely. The Ulua travels through a system of these canals to deposit some of its rich clay-loam silt on the lowlands before discharging into the ocean.

structive river was carrying enough good soil in suspension to cover 25,000 acres of land with a 12-inch layer of soil!

The velocity of the stream, its bed, and its banks were observed closely by Cuyamel's engineers. Not a sluggish river, the Ulua drops 1 foot in 4,500. Throughout the centuries as its muddy waters had coursed from the mountains to the sea, the river had been depositing part of its silt load along its bed. This meant that the bed was continually rising and making it easier and easier for the waters to spill over the banks. This in turn had made the banks broader and richer, for silt was deposited here, too, but it also meant that protecting levees must continually be reinforced and built up.

### Reclamation by Sedimentation

In 1919, Sam Zemurray's Cuyamel Fruit Co. acquired new holdings on the west bank of the Ulua. The holdings included a narrow strip of fairly high land along the river and festering swampland back of the river banks.

Pat Myers and Sam Zemurray held a long series of discussions which culminated in a history-making decision. The shrewd business man and the imaginative engineer agreed to tame the Ulua. This time it was to be no new string of protective levees. The Ulua was to be put to work, rebuilding the land it had, for centuries, so wantonly overrun.

The first experiment in soil reclamation by sedimentation was started on a small block of land comprised of sections of the Santa Rosa and Mopala farms. Pat Myers' crews worked with hand tools, cutting 19 *boquerones* or ditches through the banks of the river

charge canals. Within three or four years, this first experiment almost literally bore fruit as rich silt built up the swamps from a few inches to between 10 and 12 feet. Another ten years and the first experiment with soil sedimentation in Honduras had yielded between 1,500 and 2,000 acres of excellent banana land from the swamps of that small block of the Santa Rosa and Mopala farms.

### Ditches and Levees

As the success of the first venture in soil reclamation by sedimentation became apparent, the Cuyamel Fruit Co. went into land rebuilding on a large scale. The system which was adopted combined levees for the protection of plantings near the river with *boquerones* leading into the low areas and drainage ditches running to the sea.

The protective levees are shaped like horseshoes with the open end downstream. Between the levees are large main canals leading beyond the back

(Concluded on next page)



## How NAYLOR Gives Contractors Twice the Pipe Footage From the Same Tonnage of Steel

Even if there were no steel shortage, it still wouldn't make sense to use twice the steel necessary to do the job.

Consider your pipe requirements, for example. Why use heavy-wall pipe when you can do many jobs as well with Naylor light-weight pipe!

This distinctive Lockseam Spiralweld pipe is the one light-weight pipe built to handle jobs normally requiring heavy-wall pipe. As a result, it gives you twice the pipe footage from the same tonnage of steel. Your installation costs are cut substantially and the entire job can be speeded up by Naylor's revolutionary new coupling methods.

Remember, Naylor pipe is stronger, leaktight and safer than ordinary light-weight pipe. It is available in diameters from 4 to 30 inches with fittings and connections to meet your exact requirements.

For the complete facts, write for a registered copy of the new Naylor Catalog. You will find it helpful in meeting your pipe problems.

MEMO

Re: SNOW REMOVAL

Looks like Haiss High Capacity Loading is the answer to our snow problem, too.

H.C.P.

The Haiss Model 75W Snow Loader digs... breaks-up and loads wet, dry or frozen snow at better than 10 yds. a minute. Clutches and gears in oil bath cannot freeze.

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## River Helps to Reclaim Waste Lowland Areas

(Continued from preceding page)

leaves into the low areas. Boquerones cut off from the main canal, carrying the waters of the Ulua into new areas which are being reclaimed. In this way, the land back of the levees is in a continuous building process while the land under cultivation is always protected.

### Heavy Equipment

After the first small experiment with 19 hand-cut canals, Cuyamel turned to heavy-construction equipment for larger and more ambitious work. Another project from the village of Santa Rita to the confluence of the Ulua River with the Comayagua was started with  $\frac{3}{4}$  to 1 $\frac{1}{2}$ -yard Bucyrus-Erie draglines. As many as eleven of these draglines have been employed to excavate boquerones up to 50 feet wide and 20 feet deep and drainage canals up to 100 feet wide and from 15 to 20 feet deep.

### 30,000 Acres Reclaimed

In 1929, Cuyamel and the United Fruit Co. with its broad holdings on the east bank of the river merged under the name of the United Fruit Co. Sam Zemurray became President of the giant firm and Pat Myers was named Chief Engineer for United Fruit's Tela and Cortez divisions in Honduras.

Until that time, United Fruit had used Ulua River waters chiefly for irrigation. Now, with reclamation-minded President Zemurray and Engineer Myers, work went ahead with reclamation by sedimentation on both banks of the Ulua River. Reclaiming waste acres became a matter of policy and a continuing program with United Fruit in Honduras.

The success of the work which started only a little more than a quarter of a century ago can best be measured in the number of acres reclaimed. Today, United Fruit has under cultivation or suitable for cultivation 30,000 acres of the world's best banana land, which only 25 years ago was waste swamp-land.

United Fruit's Pat Myers foresees eventual reclamation of more than 100,000 acres of Honduras swampland as a result of those first 19 hand-cut boquerones. Work now being started or under study on new large blocks of wasteland includes floodwater ditches up to 300 feet wide. One proposed project to reclaim additional thousands of acres and to take floodwaters away from plantings would involve more than 7,000,000 cubic yards of dredging for four large new drainage and outlet canals to the sea.

A representative of CONTRACTORS AND ENGINEERS MONTHLY visited Pat Myers recently on his 150-year-old plantation at Tarheel, N.C., where he grows tobacco and corn. Although he will reach United Fruit's automatic retirement age in two years, Mr. Myers still spends part of each year in Honduras. Spry, wiry, and bronzed from his years in the tropics, the only evidence of a near-retirement age is his great mop of hair which has turned from brown to a



Here, in the upper end of the Sula Valley in Honduras, the Ulua River now rebuilds land it formerly despoiled. Within 25 years this reclamation program has netted the United Fruit Co. some 30,000 acres of the world's best banana lands.

snowy white. He is still very inter- | ested in the work which continues in

Honduras and has a room full of maps and charts showing both present and future plans for further reclamation by sedimentation. And he is emphatic in his belief that what has been accomplished in Central America can be done in many other river valleys throughout the world.

"It's sort of the way a person looks at it," he said. "Some people think of rivers as something to fight against, but down in Honduras we sized up the situation and decided we would be a lot better off if we could get the river on our side to fight with us."

### C. W. Seiberling Dies

Charles Willard Seiberling, a pioneer in the development of America's rubber industry, died September 20, in his 85th year. He and his brother, F. A. Seiberling, were founders of the Seiberling Rubber Co., Akron, Ohio, soon to mark its silver anniversary. They had previously been active in organizing the Goodyear Tire & Rubber Co.



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Single and multiple drum with universal or roller fairleads.



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Tough and rugged design for standard makes of tractors.



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Adjustable-angle blades for standard tractor mounting.



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## SAFE DRINKING WATER



C. &amp; E. M. Photo

Water buckets and a community dipper should be obsolete on today's construction jobs. Safe drinking water should be provided in clean covered containers, with individual paper cups for the men's use.

## Cleaner Steams Grime From Your Equipment

A new model of the Hypressure Jenny is now available for cleaning dirt and grime from construction and maintenance machinery, shop equipment, buildings, etc. Its feature is a highly atomized mixture of steam, hot water, and cleaning compound applied under pressure through a spray nozzle.

Normal operating pressure with the new Model JO Jenny ranges from 80 to 120 pounds at a 90-gph water capacity. Fired by oil or gas, the self-contained cleaner needs only an electric-current outlet and a hose connection to water supply for operation. All machinery is mounted on one end of the compact streamlined steel unit. Large semi-steel wheels and a steering tongue afford easy portability.

A detailed description of the new steam cleaner will be sent upon your reference to this notice. Write the Hypressure Jenny Division of the Homestead Valve Mfg. Co., Coraopolis, Pa.

## Shovels, Draglines, Drills Pictured in War and Peace

In war and in peace progress starts with excavation, the Bucyrus-Erie Co. tells us in a booklet featuring its machinery. Devoted to the firm's large shovels and draglines, and its oil-field, blast-hole, and water well drills, the imposing 74-page brochure contains many photographs showing Bucyrus machines in roles directly concerned with the victory. Highlighting the presentation is a photograph showing a 3/4-yard general-purpose excavator, familiar to contractors everywhere, working alongside a 33-cubic-yard stripping shovel so huge that it could pick up the smaller unit in its dipper!

Interested readers of CONTRACTORS AND ENGINEERS MONTHLY can obtain copies of this Bucyrus report. Write the Bucyrus-Erie Co., South Milwaukee, Wis., and ask for the brochure "Progress Starts With Excavation" as mentioned in this notice.

## New Johnson-March Dealer

The Quality Materials Co., 344 Delaware Ave., Buffalo, N. Y., has been appointed general distributor for the construction products made by the Johnson-March Corp., New York City. The line includes specialized waterproofing compounds, concrete additives, and concrete-curing compounds.

Quality Materials will carry warehouse stocks in various cities throughout its territory which includes the midwest, northeast, and New England states.

## Huber Engineer Dies

Harry Carl Ehrick, Chief Engineer for the Huber Mfg. Co., recently died of a heart ailment at the age of 59. His twin brother, William F. Ehrick, is Huber's Plant Manager.

H. C. Ehrick joined the firm as a production engineer in the early 1930's. He left in 1939, to serve as Works Manager of the Buckeye Traction Ditcher Co., at Findlay, Ohio, but returned to Huber in June, 1944.

## All-Wheel-Drive Trucks

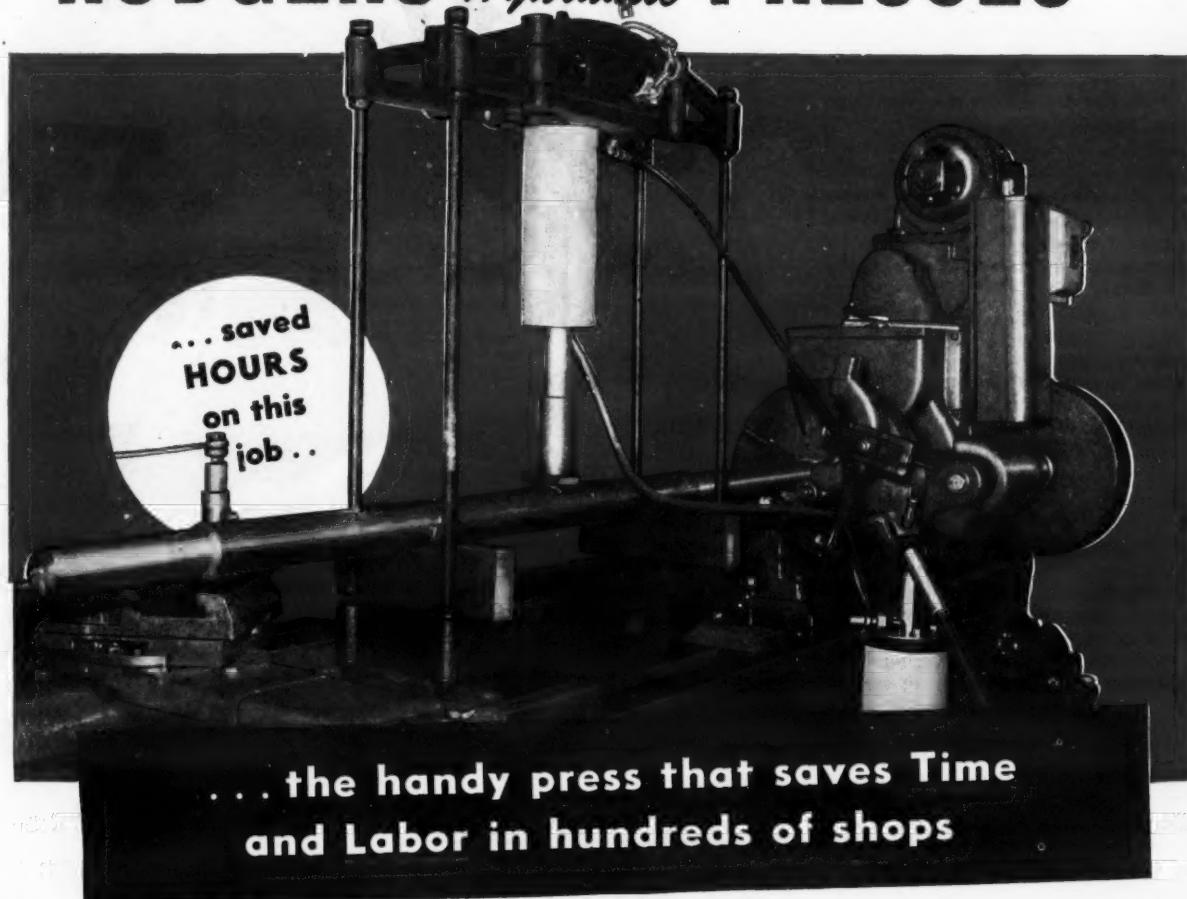
The conversion of Ford trucks to heavy-duty hauling needs is made possible by the Marmon-Herrington all-wheel-drive system. Installed in any standard Ford, this system converts the truck to 4 or 6-wheel units in which all wheels drive. Details on these Marmon-Herrington conversions are given in a catalog which may be secured from the firm, 1511 W. Washington, Indianapolis 7, Ind.



AD 164

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The shafts were 92" long x 3 1/2" dia. and had to be perfectly straight for threading and finishing of ends. They were put on lathe centers, turned to establish the high spots and then placed between the V-blocks on the Rodgers Universal and pressed until the shaft was true. Then the V-blocks were removed, shaft placed on lathe centers again and finished.

The Rodgers Universal remained on the lathe bed while all of many shafts were finished — some of them 120" long x 5 1/2" dia.

Think of the saving — no handling and re-handling off and on the lathe — and it gave them a truer shaft, a better finished job.

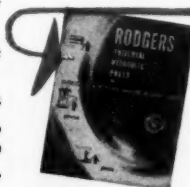
Perhaps your problem isn't shafts — but if you have miscellaneous pressing, pulling, forcing, jacking or clamping work around your shop, you will find a Rodgers Universal Press a mighty handy tool to have. Check into it — today, by writing for complete details.

CAPACITIES—Models from 50 tons to 200 tons.

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## County Is Ready For Winter Storms

**Truck-Mounted Spreaders Deposit Rock Salt Whenever Snow or Sleet Begins, to Prevent Ice Formation**

WE all talk about the weather, but in Butler County, Ohio, they do something about it as well, Fred Hammerle, the County Engineer, reports. No sooner was last winter on its way out than the Butler Highway Department was making plans for a campaign against problems expected this season.

Winter descends on Butler County in November and lasts through March. About five bad snowstorms a year plus many freezing rains and sudden temperature changes give the county forces a work-out on the 270 miles of highways they maintain.

When bad weather shapes up, the entire force is put on the alert, most of the men responding automatically before an alarm can even be sent out. Privately owned trucks, hampered in their own work during storms, are under contract to the County for snow and ice removal, and they quickly assemble for action.

By the time the snow or sleet begins falling, these trucks are ready to leave the central storage warehouse at Hamilton with loads of rock salt. Four County-owned spreaders, two large and two small, are attached to specified trucks and sent to hills, railroad crossings, intersections, and other bad spots.

Rock salt is always spread at the beginning of a storm, special attention being given places known to be dangerous. The salt keeps the snow mealy, Mr. Hammerle says, forestalling the formation of ice and bonding to the pavement. This makes for easy removal and reduced plowing costs, he indicates.

Timing is very important in salt-placement operations. Once the freezing rain or blizzard begins, the men pitch in and often put down as many as 20 truckloads of rock salt at one time to make certain an ice sheet does not

storm is needed to provide bare highways almost as soon as the rain stops. Not only is the product economical to use, he asserts, but it is also popular with the men as it is easy to handle.

Last winter, with almost continual storms from November through March, the County spent \$22,500 to keep its roads open. This year it plans to extend the use of rock salt in ice control. Various townships also get rock salt from the County Department to clear the 442 miles of streets and school roads under their care.

### Asphalt and Tar Kettles

Cast insulation features a series of asphalt and tar-melting kettles made by W. G. Chausse, manufacturer of a varied line of construction and maintenance equipment. The kettles are built in stationary, 2-wheel, and 4-wheel models. Their capacities range from 30 to 300 gallons. Chausse describes these products in a folder, Circular TA, which you can obtain on mention of this no-

tice. The firm is located at 4453 14th St., Detroit 8, Mich.

### Electric Megaphone Is Readily Portable

A self-powered electric megaphone said to be capable of projecting intelligible speech up to ½ mile has been put on the market by International Industries of Chicago. It is applicable to directing, summoning, or warning workmen dispersed over wide areas.

Powered from batteries carried in a shoulder-slung case, the entire unit weighs 11 pounds and is simple to operate. A pistol grip in the handle of the horn makes it available for use in all emergencies. It is equipped with a volume control for outdoor or indoor use.

You will receive full details on the instrument if you write to International Industries, Inc., and mention this notice. The address is 6453 N. Clark St., Chicago 26, Ill.

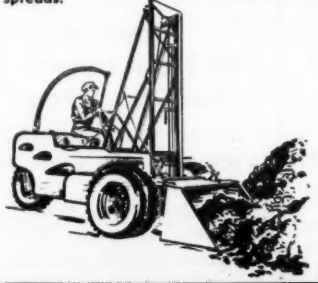


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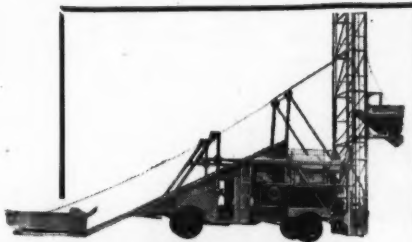
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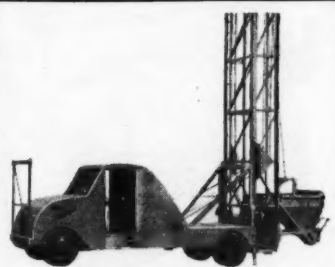
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### Congress-Appointed Basin Agency Urged

In a speech before the fall meeting of the American Society of Civil Engineers at Kansas City, Mo., John C. Stevens, of Portland, Oreg., formerly

President of the Society, sharply criticized the proposed administration for the Missouri Valley Basin project. Mr. Stevens called Federally instituted authorities "unnecessary, in conflict with state interests, and a menace to state rights, particularly those of water which have been jealously guarded since the founding of the country".

Mr. Stevens recommended a council created by Congress that would, first of all, be made up democratically of one representative of each interested Federal department—the U. S. Corps of Engineers, the Bureau of Reclamation, the Soil Conservation Service, the Federal Power Commission, and the U. S. Health Service. Also included in its membership would be one representative of each of the states in the basin, appointed by the governors. As directly representative of the general public, there would be added a number of civilians appointed by the President, including a civil engineer, an attorney, an economist, a banker, and a representative of labor, one of whom would

be designated as president of the council.

"Detailed work of the council would be carried on by an executive committee of five members," he explained, "who would devote their entire time to the work and receive adequate compensation. The Federal and state members would be paid by the Government and the states, respectively, and the civilian members would receive compensation from the council commensurate with the services rendered." Mr. Stevens concluded by saying that in this way, the best interests of the people would be served, economically and through established democratic processes.

### Richkraft Executives

Merle L. Cripe and C. A. Cook have been appointed Vice Presidents of the Richkraft Co., Chicago. Mr. Cripe heads the research department. Mr. Cook will continue to supervise western sales from Oakland, Calif.



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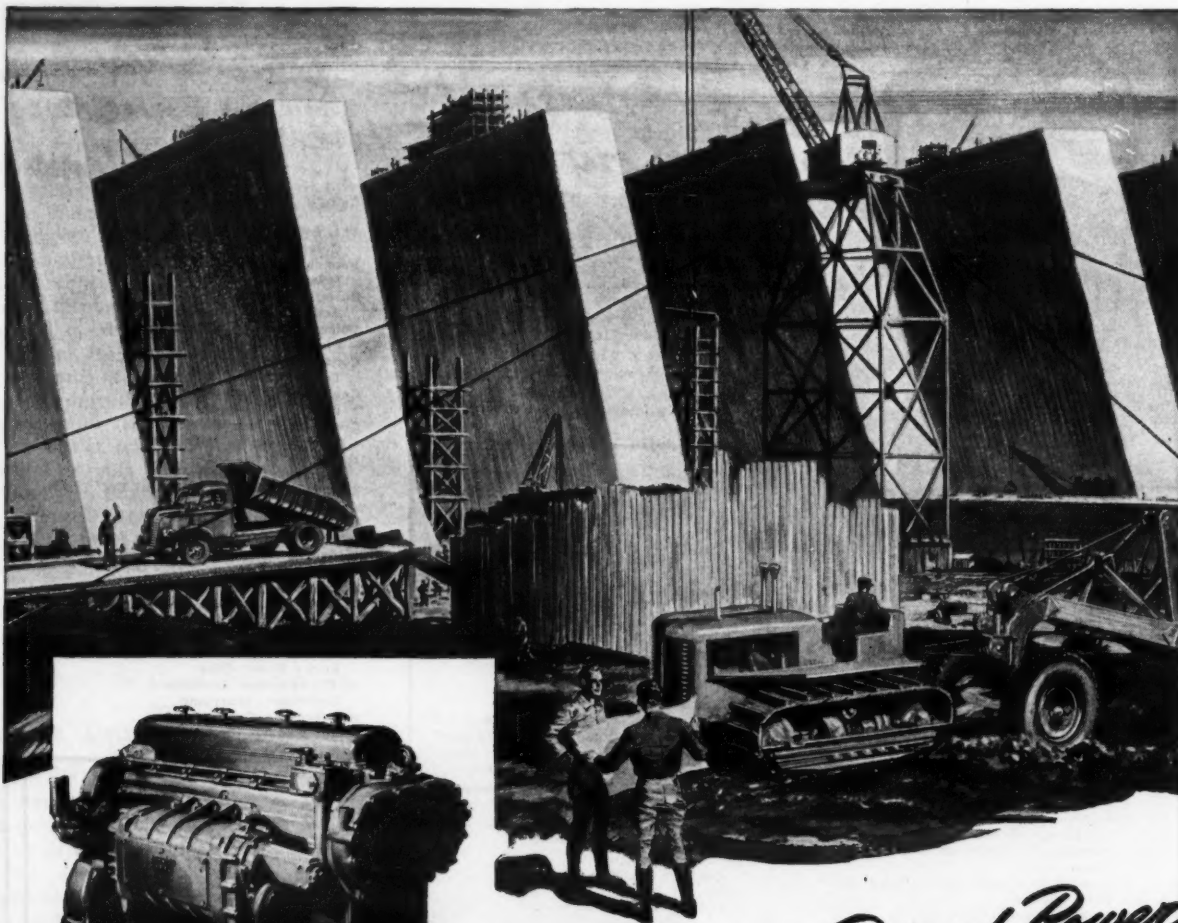
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# Grading Completed On Parkway Sections

## New Washington-Baltimore Route Gets Start as Four Contractors Grade 6 Miles; Drainage Structures

A GOOD start was given to the new Washington-Baltimore Parkway this season when four contractors completed grading and drainage sections totaling 6 miles in Prince Georges and Anne Arundel Counties, Md. When this alternate route is completed in its entirety, it will relieve the heavy load of traffic now carried on a 40-mile stretch of U. S. 1, the only direct highway between these two big eastern cities. Although no one will predict when the entire parkway will be completed, this recent work is a step in the right direction and is a good "talking point" for seeing the entire project through to a finish. This initial 6 miles of construction is not continuous, since it consists of two 3-mile stretches, one just outside of Washington, and the other near Laurel, Md., about midway of the two cities. The two completed portions are separated by an 11-mile gap.

The four contracts, designated B, C, H, and J, were entirely Federal government work, and were awarded and supervised by the Public Roads Administration. The length, yardage of excavation, the contractor, and the contract price on these four sections were as follows:

Contract B—1.6 miles; 719,500 cubic yards; Hendrickson Bros., Inc., Valley Stream, L. I.; \$351,225. (Ralph Myers Construction Co., Salem, Ind., assisted in this work.)

Contract C—1.4 miles; 561,500 cubic yards; R. B. Jaggard Engineering Co., Westmount, N. J.; \$331,633.

Contract H—1.3 miles; 512,000 cubic yards; Dutcher Construction Co., Queenstown, Md.; \$282,100.

Contract J—1.7 miles; 291,000 cubic yards; Virginia Paving Co., Arlington, Va.; \$229,415.

Totaled the four contracts amount to 6.0 miles, 2,084,000 cubic yards, for \$1,194,373.

Projects B and C were contiguous, starting about 2 miles outside the northeast District of Columbia line in Prince Georges County at a point on U. S. 50, known as the Defense Highway to Annapolis. The upper two contracts, J and H, also contiguous, began at the Laurel-Fort Meade Highway and extended through Anne Arundel County nearly to the town of Jessup. All jobs were built through new location. Work on projects B, H, and J started in July, 1945, and were finished by May of this year. The R. B. Jaggard Engineering Co. contract, the subject of this article, did not get under way until last September and was completed by the end of June.

### Jaggard Contract

The preliminary clearing and grubbing was done by a combination of hand labor and two cranes—a General with a 40-foot boom and a ¾-yard clamshell

bucket, and a Lorain with a 45-foot boom and a ¾-yard clamshell bucket. A force of 25 cut the trees and brush while the cranes gathered it into piles for burning. Some of the timber was given to a sawmill which sent its own crew and trucks to cart the material away, a task made difficult by the thick woods and rolling terrain. Where the fills are more than 3 feet high the tree stumps were left in the ground, but in fills below that height they were dozed out by a Caterpillar D7 tractor-dozzer.

Grading started in October and continued until December 3 when the job was shut down until March of this year because of the weather. The material in this part of the country is a thick, tough clay, both red and gray in color, with a tendency to clump together in



C. & E. M. Photo  
R. B. Jaggard Engineering Co. used the equipment combination pictured here for short hauls on its section of the Washington-Baltimore Parkway. An Allis-Chalmers HD-14 tractor with torque converter clutch is pulling a Gar Wood 12-yard scraper; a Caterpillar D8 acts as a pusher in loading.

large pieces. Parts of the job, however, went through sand and loam, easing the burden somewhat. The fact that no rock was encountered in this balanced earth-work job enabled the contractor to excavate and move all dirt with self-

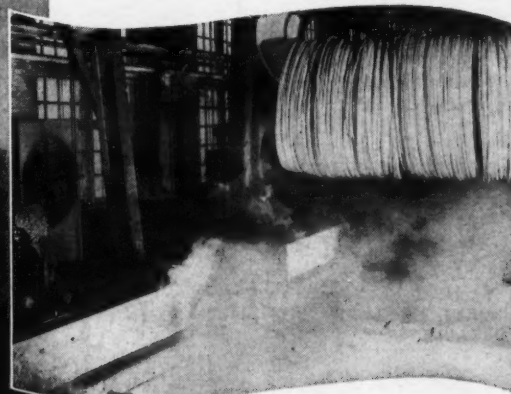
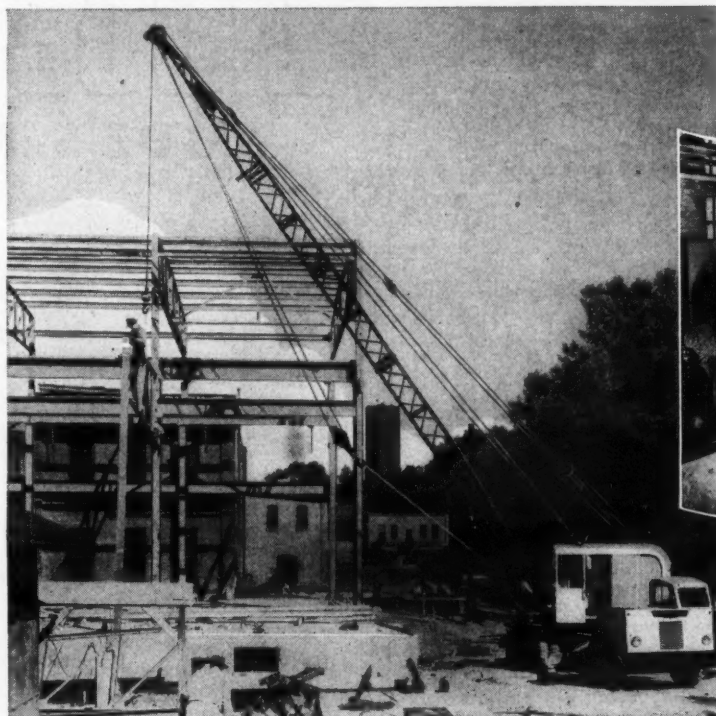
propelled and tractor-drawn scrapers.

Cuts from 500 to 600 feet long and as much as 50 feet deep in places were met, along with fills stretching for 1,400 feet and having a maximum height of

(Continued on next page)

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## Grading Completed On Parkway Sections

(Continued from preceding page)

35 feet. In general, fill slopes are 4 to 1 for heights of fill up to 15 feet, with a minimum of 2 to 1 slopes for higher fills. Cut slopes, in general, are 4 to 1 for cuts up to 15 feet in depth, with a maximum of 2 to 1 for deeper cuts. The steepness of both the fill and cut slopes is dependent on the type of material encountered; this information was obtained from advance Gow and auger borings.

The parkway has a minimum right-of-way width of 400 feet which follows the existing property line as closely as possible to avoid leaving inaccessible parcels. Grading was done for a dual roadway of 56 feet each strip with a center strip of varying width. This contract included rough grading only; at some future time the roadway will be covered with 18 inches of base-course material in preparation for a pavement.

### Grading Equipment

On hauls from 800 to 1,500 feet, the contractor used four Super C 12-yard Tournapulls which were loaded with the help of a Caterpillar D8 tractor. With the D8 tractor pulling the Tournapull by means of a bar with a loop at the end for the short loading distance, about 15 yards was heaped up into each scraper bowl. As soon as the loading was complete, the D8 lowered its bar while the Tournapull turned to one side and continued under its own power alone to the dump area.



C. & E. M. Photo  
At the equipment-maintenance center on the E. B. Jaggard Engineering Co. contract each piece of equipment was greased every eight hours.

For the shorter hauls, from 600 to 800 feet, a fleet of four Gar Wood 12 to 15-yard scrapers was used, pulled by Allis-Chalmers HD-14 tractors with another D8 tractor acting as a pusher-loader. The combined total equipment moved an average of 4,000 yards of dirt in a 10-hour day, equally divided between the self-propelled and the tractor-drawn units in the scraper fleet. The material was spread in 8-inch layers and leveled off with a D7 tractor-dozzer and a Caterpillar No. 12 power grader. Maximum compaction was attained with three sets of dual-drum sheepfoot rollers pulled respectively by a D7 crawler tractor and two Case rubber-tired tractors.

### Care of Equipment

Every 8 hours each piece of equipment was greased on the job at a com-

pact portable wooden trailer mounted on four metal wheels. Here the necessary lubricants were administered through Alemite or Phillips grease

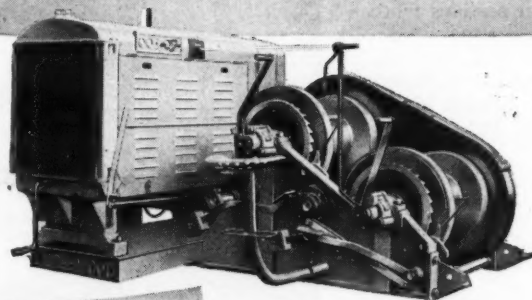
guns. Fuel was supplied by the Atlantic Refining Co. of Baltimore, which serviced the 1,000-gallon underground gasoline tank, and also kept full of diesel oil the 1,250-gallon tank mounted on a White truck which moved about the job filling the tanks of the diesel-powered equipment. Four 1½-ton service trucks rounded out the rest of the contractor's equipment, including a GMC, an International, and two Chevrolets. One of the two latter units was outfitted with a G-E 400-amp electric welder and an oxyacetylene set. The other Chevrolet carried an Ingersoll-Rand 110-cfm air compressor to supply air for the three I-R mechanical rammers used in compacting the 6-inch layers of backfill placed over drainage pipe.

### Drainage Structures

In addition to the nearly 15,000 feet of drainage pipe, this contract also included the construction of two concrete culverts—a 6-foot plain-concrete arch

(Continued on next page)

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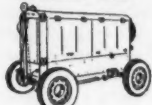


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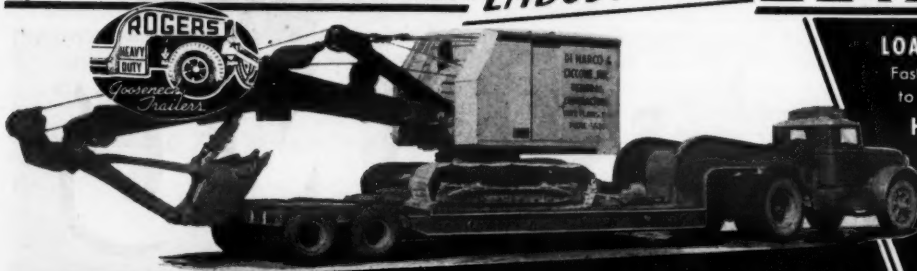
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## Grading Completed On Parkway Sections

(Continued from preceding page)

368 feet long, which is topped by a 30-foot fill; and a double 10 x 12-foot reinforced-concrete box culvert 278 feet long, over which is a 10-foot fill. The necessary excavation was made by the same cranes used in the clearing operations. Wooden collapsible forms, designed and built by the contractor, were erected to contain the concrete pours.

The forms were made in 44-foot sections of  $\frac{3}{4}$  x 8-inch square-edge sheeting, including the necessary overlapping space so that a 40-foot pour contained within bulkheads was possible. The walls were supported with 2 x 6 trussed ribs or studs on 16-inch centers, with 2 x 6 knee braces set at a 45-degree angle along each top corner of the double-barrel culvert. These braces were framed into the studs for the length of the culvert form. Double 2 x 4's for wales were spaced 16, 20, 24, and 32 inches, with the lowest of the five wales placed just above the concrete floor. Richmond screw anchors were used for the tie rods.

The collapsible features of the box-culvert forms were the double ridge poles at the top of each barrel which were held together by a  $\frac{1}{2}$  x 5-inch bolt every 4 feet. Thus the two half forms were easily separated by removing the bolts, after which the entire panel was slid out of position on a 2 x 6 shoe at the bottom of the form. The two sections did not quite meet at the top since the ends were cut  $\frac{1}{4}$  inch out of square to permit sliding on the sill when it was necessary to shift the form panels.

To assist in erecting the outside panel forms,  $\frac{1}{2}$ -inch steel pencil rods were embedded along the side of the concrete floor slab on 3 $\frac{1}{2}$ -foot centers. These rods, about 2 feet long, projected out 18 inches to support the forms until they were tied together and braced. Previously the rods had been notched for  $1\frac{1}{2}$  inches with a hack saw to form a square cross section so that the rod might later be broken off at the outside without much effort. The notched  $1\frac{1}{2}$ -inch portion was that just within the concrete, and when the rod was snapped off the hole was covered over with mortar.

Another time-saving feature in the double-box form construction was the use of  $\frac{3}{4}$ -inch reinforcing rods to sustain the bulkheads placed at the end of the pours. Usually the vertical sheeting of such bulkheads is backed by 2 x 4 studs and a lot of timber bracing which takes time to build and also to remove. By passing the steel rods through both wall forms, parallel to the floor and on 16-inch centers, no other bracing was necessary, while their placing and dismantling was simple and quick.

The floor and roof slabs of the box culvert are 15 inches thick where the culvert passes under the center parkway area, and 19 $\frac{1}{2}$  inches thick under the area where the pavement will eventually be laid. The culvert walls are 12 and 15 inches thick under the same respective locations. Concrete was purchased from the A. H. Smith Co., which



C. & E. M. Photo

The contractor designed and built the collapsible wooden forms on this double 10 x 12-foot reinforced-concrete box culvert included among the drainage structures.

delivered it to the job in truck-mixers from a plant near Bladensburg, 4 miles from the end of the project. From three to five mixers were used, each

having a capacity of 3 yards. The concrete was chuted into a Blaw-Knox 22-cubic-foot bucket and lifted to the forms on the 45-foot boom of the Lorain

crane. During the pouring of the floor and lower lifts of the walls, a Marlow pump kept the water from the forms. Curing was done with wet earth.

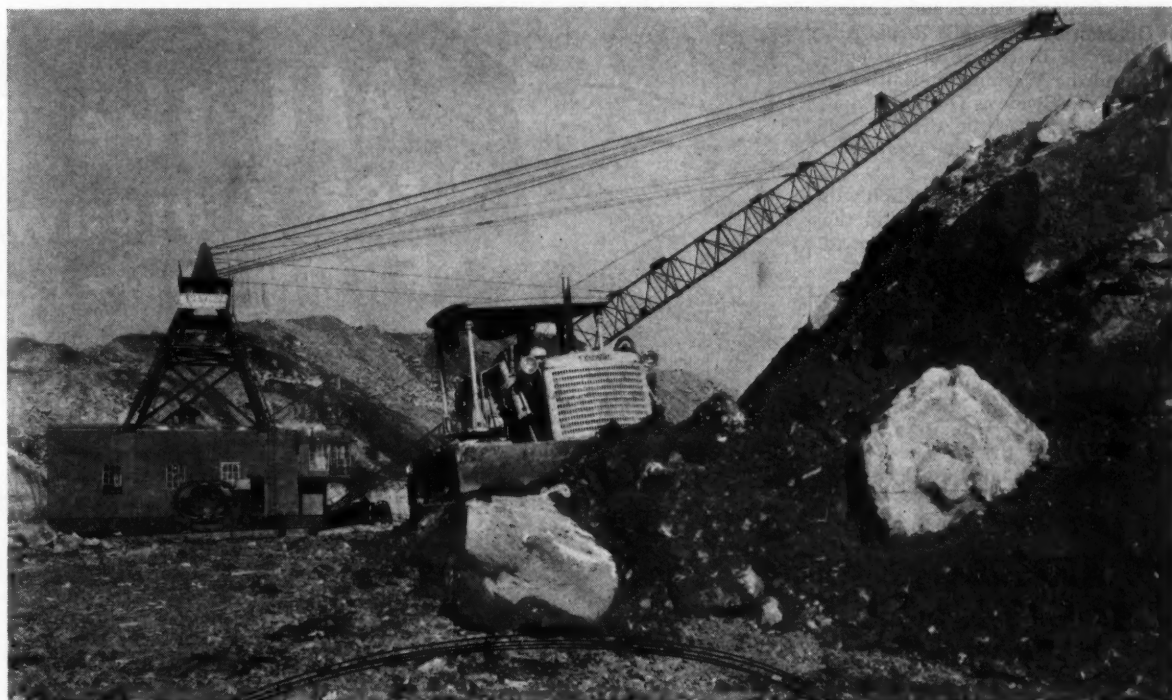
### Quantities and Personnel

The major items of the \$331,633 R. B. Jaggard Engineering Co. contract for 1.4 miles of parkway grading and drainage included:

Clearing and grubbing	56 acres
Stripping and storing topsoil	3,800 cu. yds.
Unclassified excavation	550,000 cu. yds.
Unclassified excavation (structures)	7,700 cu. yds.
Concrete	2,210 cu. yds.
Reinforcing steel	204,000 lbs.
Reinforced-concrete pipe, 18 to 48-inch	8,190 lin. ft.
Clay-pipe underdrain, 6-inch	6,400 lin. ft.

A force of about 25 worked on the grading and drainage under the supervision of Superintendents Ernest White and William M. Louderback in charge respectively of those two operations for the contractor. For the Public Roads Administration, Alpha Cook was Project Engineer on the southern 3-mile stretch of parkway which included the

(Concluded on next page)



**"Gulf Quality Lubricants**  
help us get top performance  
from equipment, fewer mechanical delays"

says this progressive Contractor\*

\* Capparell Stripping & Construction Co., Hazleton, Pa., is stripping rock overburden from a large anthracite coal deposit in Luzerne County, Pa. Gulf quality lubricants are helping this contractor keep their big drag lines and Diesel tractors on the job and operating efficiently.

**"A LARGE SHARE OF THE CREDIT** for our rapid progress and low operating costs on this stripping job goes to Gulf quality oils and greases," says this Contractor. "Gulf lubricants help us get top performance from every unit of equipment, fewer mechanical delays, and rock-bottom maintenance costs."

There are three solid reasons why so many leading contractors specify Gulf quality lubricants. One is performance—higher lubricating value and longer life—that insures less wear and smoother operation. Another is the high type of engineering service Gulf provides to insure the right lubricant in the right place. Third, Gulf's prompt delivery service.

You, too, can benefit by using Gulf quality

lubricants on your next contract. Write, wire, or phone your nearest Gulf office today and ask a Gulf Lubrication Engineer to call. He will recommend the proper types and grades exactly suited for your requirements.

**GULF OIL CORPORATION • GULF REFINING COMPANY**

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## "BICKNELL BETTER BUILT" PAVING BREAKER TOOLS



We manufacture a complete line of tools for pneumatic paving breakers, rock drills and diggers.

Write for descriptive circular

**BICKNELL MANUFACTURING CO.**

12 LIME STREET ROCKLAND, MAINE





### Grading Completed On Parkway Sections

(Continued from preceding page)

Jaggard contract, while W. W. Osborne was Project Engineer on the two northern projects. H. J. Spelman, Division Engineer, Eastern Parks and Forests Road Division of the Public Roads Administration, is in charge of the construction on the Washington-Baltimore Parkway. C. E. Swain is Division Engineer of Division 2 of the PRA, which includes Maryland and the District of Columbia.

The Public Roads Administration will not continue the Parkway beyond the north end of Project H, as the Maryland State Roads Commission will construct the parkway from that point on to Baltimore where it eventually will connect with the proposed by-pass of that city. Another link from the south end of Project B to meet the District of Columbia line will be built. However, the alignment for this section is held in abeyance pending the completion of plans for the entrance of the Parkway into the City of Washington.

### Integration of Highways Colombia's Big Problem

Colombia, northernmost South American republic, is cut by three major Andean mountain ranges running north-south in the east, center, and west. Because of this chopped-up terrain, its jungles, and its climate, most of Colombia's population centers on the hilly uplands back of the Pacific and Caribbean seacoasts, and along the rivers that drain the country. For this reason, water routes form the backbone of the nation's transportation.

One must not discount, however, the notable progress which the country has made in the past 10 years towards unifying its scattered roads into an organized national highway system. There is an average of a mile of road per 39.4 square miles of area, the Federal Government operating 6,586 miles, and the Departments 4,580. Although this is far behind the figures for Colombia's neighbors, it is significant to note that a 30 per cent increase in national-highway mileage was accomplished in 1939-44.

The Ministry of Public Works supervises the building and maintaining of the national highways through the Bureau of Highways and Railways. The Departments (similar to our states) operate the local feeder roads. Tariff schedules and routes for common carriers are established by a national board, and enforced by sectional agencies, which also police the use of the roads. Dirt-rock, gravel, or macadam surfacing is found on about 70 per cent of the nation's highways, asphaltic-concrete or penetration-asphalt paving on about 6 per cent. Present plans call for paving the projected trunk-highway system with asphalt from beds in the Department of Boyaca.

While road-building contracts generally go to native firms, United States organizations long established in Co-

lombia have secured good contracts, and will probably continue to do so. The Colombia Government spent nearly \$55,000,000 on construction during the years 1938-44, and estimated at that time that \$17,712,000 would be needed to complete the national trunk system.

Two different routes will mark the Pan American Highway as it crosses Colombia. Covering several sections of the national highway system, these will form an X, with Bogotá as its center and terminals on the borders of Venezuela, Ecuador, Panama, and Brazil.

A full report on how Colombia is organizing her highways for improved contribution to the national economy has been assembled by the Transportation and Communications Division, Office of World Trade Promotion in its Industrial Reference Service, U. S. Department of Commerce, from American Embassy findings, and can be obtained on request to the Service or from the Superintendent of Documents, Government Printing Office, at Washington 25, D. C. Price: 5 cents.

### Pump Firm's History

Three-quarters of a century of contribution to the nation's pumping industry are reviewed in a 72-page history, just issued, of the Byron Jackson Co. The firm makes pumps for con-

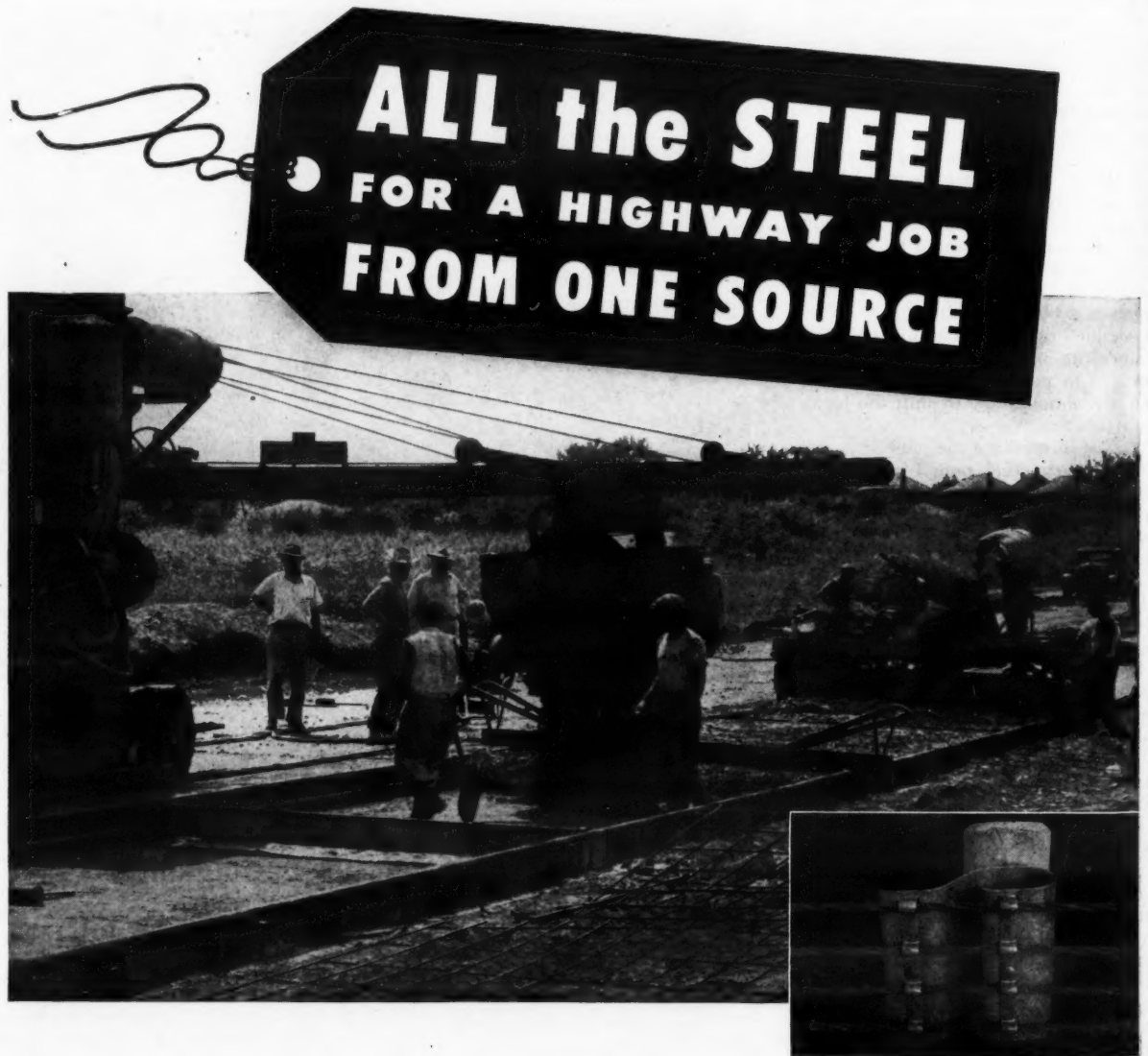
struction, irrigation, mining, dredging, and many other uses. Copies of the illustrated booklet "Horizons" will be sent to you on request. Write the Byron Jackson Co., Box 2017, Terminal Annex, Los Angeles 54, Calif., and mention this notice.

PROTECT YOUR FUTURE

Save The Sure Way

— through the

Payroll Savings Plan



If you have a contract for a highway job, you'll find it convenient and economical to have Bethlehem supply all the steel needed to complete the project.

Bethlehem's steel service means that you get from one source all the steel items required to build any highway or highway bridge. Your order is handled as a unit, with individual items scheduled to arrive at the project when and as you need them. You save in several ways—in reduced bookkeeping, in fewer follow-ups, in avoidance of needless delays—when you use Bethlehem's steel service.

#### Leading Bethlehem Highway Products

ROAD JOINTS	REINFORCING BARS	BAR MATS	GUARD RAIL
	GUARD RAIL POSTS AND BRACKETS	WIRE ROPE AND STRAND	
HOLLOW DRILL STEEL	FABRICATED STEEL CONSTRUCTION	SHEET AND H-PILING	
TIE-RODS	SPIKES	BOLTS AND NUTS	

#### BETHLEHEM CABLE GUARD RAIL

with bumper-type bracket makes a neat-looking, effective safety device for use on modern highways. Furnished to comply with all state specifications. Can be used with posts made of steel, wood, or concrete.

#### BETHLEHEM STEEL COMPANY BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation



## STEEL FOR HIGHWAYS





The new Bros Sno-Flyer for airport work pulverizes snow in its double rotary wheels and casts it 150 feet back of landing lights.

### Rotary Snow Plow For Airport Work

A new high-speed rotary snow plow, especially applicable to airport work, has been announced by the Wm. Bros Boiler & Mfg. Co. of Minneapolis. The Bros Sno-Flyer is designed to remove snow with only one or two handlings.

According to the manufacturer, the specially designed feeding rake permits the rotary to work in snow from 2 inches to 12 feet deep. The gathering wings and the safety shear pins attached to the 8-foot plow frame allow an overall cutting width of 14 feet. These gathering wings collect the snow to within 1/2 inch of the runway surface. They force it into the double rotary wheels powered by an 8-cylinder 275-hp gasoline engine mounted on the rear of a 7-ton 4-wheel-drive truck. The heavy-duty rotary blades and feeding rake pulverize the snow into a consistency that permits casting 150 feet either to the right or left of the runway. As the snow leaves the rotary blades, it passes through a casting chute and deflector which distribute the snow on a flat plane, not in windrows.

The plow, feeding rake, and wings are completely hydraulically controlled from the truck cab. The gathering wings may be individually lifted up 19 inches in order to clear snow from airport landing lights. The manufacturer claims that the Bros Sno-Flyer can be run efficiently at speeds up to 25 miles per hour over a surface of 6 inches of snow and an inch of ice crust. The casting capacity is rated up to 51 tons of fresh fallen snow per minute. If a loading chute is desired, it may be quickly attached. The loading capacity is four 5-cubic-yard trucks a minute, according to the Bros Company.

For further information on the Sno-Flyer, write to the manufacturer at 1057 Tenth Ave., S.E., Minneapolis, Minn., and refer to this news report.

### A Hauling Trailer That Tilts to Load

Out in Michigan contractors are being introduced to a new trailer for hauling machinery and other loads. It features a tilting platform onto which the load is rolled in a one-man easily accomplished operation.

Built in four models, the trailer can carry up to 3 tons. It has an 8 x 14-foot platform of wood or steel plate, as desired, mounted on a pair of single or dual wheels. An adjustable hitch facilitates attaching the trailer to a truck or

tractor. The hitch also levels the load for traveling.

The tilting platform pivots on the trailer axle when disengaged from a locked position. A hydraulic jack is available; it is said to make the tilting effortless and to eliminate jar when loading or unloading. Loading can be accomplished by a heavy-duty hand-

operated winch which allows one man to pull the load up or down the ramp formed by the tilted platform.

The welded-steel frame of the trailer is reinforced by X-type cross bars. Box-type stake pockets are fabricated in the railings. Warner Electric brakes control the trailer from the cab of the hauling unit. A retractable stand at the hitch allows the trailer to stand level when not attached to the pulling unit.

Photographs and a complete description of this tilting-platform trailer are included in a bulletin issued by the manufacturer, the C. N. Monroe Mfg. Co. Write Monroe at 2525 So. Dort Highway, Flint 7, Mich., for information and mention this notice.

### Frederick Snare Dies

Frederick Snare, Chairman of the Board of the engineering and contracting firm that bears his name, died in Havana, Cuba, September 22. Mr. Snare was 83 and had been residing in Cuba for the past two years.

### Mobile Crane-Shovel

Time-saving is the feature stressed by the Michigan Power Shovel Co. in a brochure describing its Model T-6-K mobile crane-shovel. This truck-type excavator-crane converts to other attachments without drum change-overs. It has a 6-ton crane capacity, and 3/8-yard as an excavator.

Bulletin 24 gives all the details of its construction. Write the firm at Miller and 2nd Sts., Benton Harbor, Mich., for copies. Just mention this notice.

### Steel-Tool-Box Trailer

Protection for hand tools on the job is given by the HanDeeBox, a trailer-mounted all-steel box built in three models by Littleford Bros., Inc. The box is both weather and fireproof and features a special locking device. Littleford will be glad to send you descriptive Bulletin V-6 on mention of this notice. Write the firm at 485 E. Pearl St., Cincinnati 2, Ohio.

## "My Vote Goes to The Truck I Drove In The Army"



Returning veterans, working on jobs where motor trucks are purchased or used, just naturally go for GMC. For wherever they served ... Africa or the Aleutians, Europe or the Pacific ... their number one source of truck transport was the GMC "six-by-six." And whatever their branch of the Army ... ground or air forces, combat or supply ... GMC "Army Workhorse" power proved its ability on the toughest jobs.

Civilian GMCs benefit by the same manufacturing facilities, incorporate the same all-truck construction and feature engines of the same basic design as their military brothers ... nearly 600,000 strong. Offered in a wide range of models, chassis types and sizes, 1/2 to 20 tons, new GMC trucks provide war-proved performance for all kinds of peacetime hauling.

Traffic accidents have increased at an alarming rate since the war. Careless driving, jaywalking and neglect of needed repairs are mainly responsible. Do your part to prevent accidents by obeying all traffic laws ... by driving safely and walking carefully ... by having your car or truck inspected regularly, repaired promptly and properly.



THE TRUCK OF VALUE  
GASOLINE • DIESEL

### VULCAN TOOLS

A complete line for  
every type of Rock Drill,  
Pavement Breaker and  
Clay Digger.

Vulcan Tool Manufacturing Co.

35-43 Liberty Street, Quincy 7, Mass.

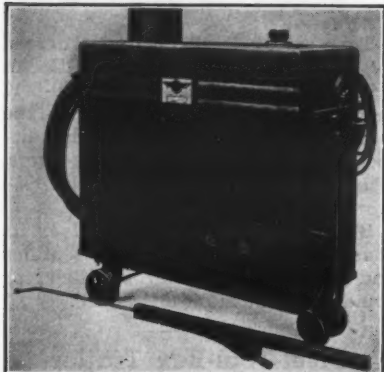
Branch Offices and Warehouse Stock:

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74 Murray St. Chicago 6, Ill.

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION





The new White vapor steam cleaner is available as a stationary unit or mounted on casters for shop use, or as a trailer-carried unit for cleaning equipment on the job.

### Vapor Steam Cleaner Is One-Man Operated

Simplification is said to feature a new vapor steam cleaner announced by the White Engineering & Mfg. Co. for use in cleaning construction machinery and trucks, stripping paint, and for other duties. The unit is designated Model MO-46B. It has an operating pressure range of 75 to 125 psi.

Manufactured as a stationary unit with base, a movable unit with casters, or as a trailer-carried model, the new cleaner is operated by one man. The machine has only four valves. An electric ignition system eliminates any waiting for the unit to warm up.

All operating parts of the machine are on one subassembly, which is removable for maintenance. Standard models have a 1/2-hp 110-volt ac motor. The burner uses No. 1 fuel oil, kerosene or light oil. A lightweight cleaning gun is balanced to obviate tiring of the operator. The unit is equipped with 25 feet of oil-resistant steam hose.

Full details about this new vapor steam cleaner can be obtained from the White Engineering & Mfg. Co., 141 W. Passaic St., Rochelle Park, N. J.

### Hydraulic Valve Has Handy Remote Control

Highly convenient remote control of the hydraulic valve is the feature of its new solenoid-operated two-way valve, Electrol, Inc., says in a recent announcement. Described as particularly suitable for installation in hard-to-reach or congested areas, the compact device is said to save tubing and oil.

Though light, the unit is rugged. It accommodates flows up to 2 gallons per minute. Its pressure range is from a fraction of a pound per square inch up to 1,500 psi, Electrol states. A 12 to 24-volt direct current is required to energize the solenoid. The valve weighs 1 1/4 pounds, and is 3 9/16 inches long x 1 1/4 inches hexagonally. Anodized aluminum-alloy bar stock comprises the housing, which has two 1/8-inch NPT female ports and two mounting holes.

Further details about this solenoid-operated two-way valve can be secured from Electrol, Inc., 85 Grand St., Kingston, N. Y. Tell the firm you saw this news story.

### Cummins Staff Shifts

Leonard W. Beck has been named 'Acting General Sales Manager, the Cummins Engine Co. has announced. He will supervise the firm's sales and service activities from Columbus, Ind., retaining his post as Manager of the Central Region.

Byron A. Duling, Manager of Cummins' Cleveland Region, has been assigned to the home office to work under Mr. Beck. Fred W. Sparks has succeeded him in Cleveland.

Corwin B. Briscoe will act as Parts Merchandising Manager at Columbus. Norman E. Palmer is now Cummins' Washington, D. C., representative.

### Heavy Dump-Body Hoists

Cam and roller hoists for heavy-duty dump trucks are described by the Gar Wood Industries, Inc., in a 6-page loose-leaf bulletin available on mention of this notice. The hoists have forged crossheads, rollers, and hinges; selected-steel piston rods; heavy-duty cross members, cams, and heavy I-beam roller tracks.

If you are interested in the installation of such body-lifting devices in your dump-truck fleet, write Gar Wood at 7924 Riopelle St., Detroit 11, Mich.

### Wood Heads SKF in N.Y.

Harrison Wood, Assistant District Manager for the SKF Industries in New York since 1941, has been promoted to District Manager. He succeeds John D. Williamson, forced by ill health to resign after heading the district for 23 years. The district embraces New York City, southern New York State, and northern New Jersey.

## HERE'S HOW

# SOLVAY CALCIUM CHLORIDE

## CAN HELP YOUR WINTER CONCRETING

It's proved: The addition of Solvay Calcium Chloride to portland cement provides:

1. **QUICKER SET**—Tests prove that the time of initial and final set is reduced by two-thirds with Solvay Calcium Chloride in the mix.
2. **HIGH EARLY STRENGTH**—Solvay Calcium Chloride speeds development of strength . . . provides 3 days' strength in one day . . . 7 days' strength in 3 days. This is important during cold weather, which slows action of portland cement.
3. **COLD WEATHER PROTECTION**—Solvay Calcium Chloride offsets dangerous effects of sudden drops in temperature, shortens protection period, adds extra protection against freezing.

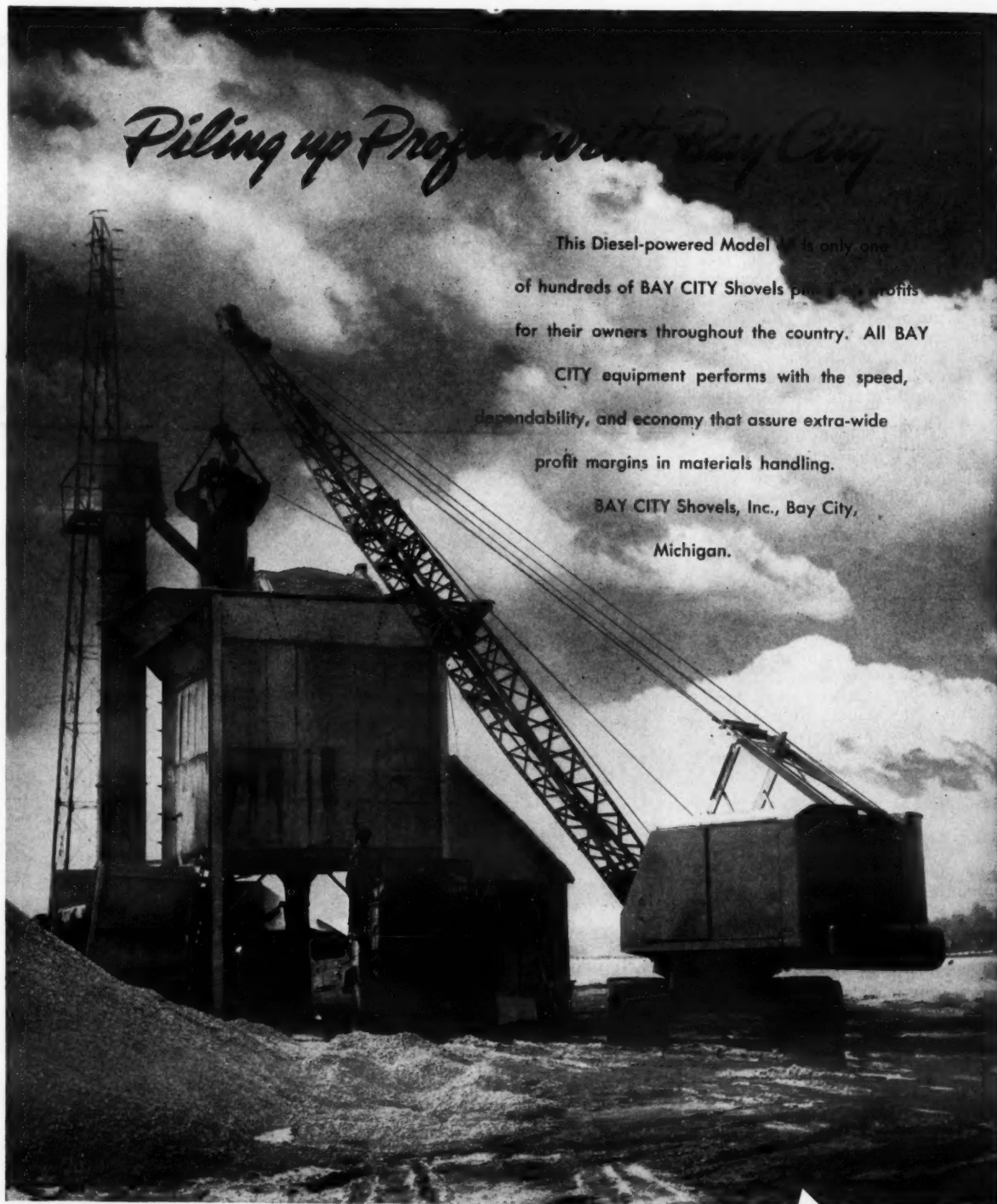
Solvay Calcium Chloride helps winter concreting without changing the normal chemical action of portland cement—and at a cost so low that the savings in finishing, forms, protection and labor far outweigh the cost of the calcium chloride.

Send for FREE Booklet giving complete details—"Calcium Chloride and Portland Cement." Write to Dept. 94-11.

### SOLVAY SALES CORPORATION

40 RECTOR STREET

NEW YORK 6, N. Y.



*Piling up Profits with Bay City*

This Diesel-powered Model M is only one of hundreds of BAY CITY Shovels piling up profits for their owners throughout the country. All BAY

CITY equipment performs with the speed,

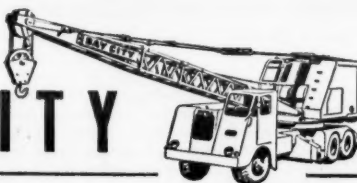
dependability, and economy that assure extra-wide

profit margins in materials handling.

BAY CITY Shovels, Inc., Bay City,

Michigan.

# BAY CITY



SHOVELS • DRAGLINES  
CRANES • HOES • CLAMSHELLS

SEE YOUR NEAREST DEALER for Bay City excavating and material handling equipment in sizes from 3/8 to 1 1/4 yards having crane rating up to 20 tons. Both crawler and pneumatic tire mounting.





# Black-Top Surface Improves Old Road

**Width Increased From 18 To 30 Feet With Strip of Tar-Surfaced Gravel Next To Old Concrete Slab**

A 1.1-MILE section of U. S. 3, the Daniel Webster Highway in southern New Hampshire, was improved this summer by covering the 20-year-old concrete slab with plant-mix. The hot-mix also extended over a widening strip consisting of a layer of gravel which had been given a tar surface treatment. A contract for this work was awarded by the New Hampshire State Highway Department to O. F. Winslow Co. of Milford, N. H., on its low bid of \$108,447.10. Work on the reconstruction project, located just north of Manchester, began on April 15 and was finished in August.

Grading for the widening was done by Landers & Griffin, Inc., of Portsmouth, N. H., on a subcontract from O. F. Winslow Co. The widening was done on the west side of the road and was topped with a 1½-foot course of gravel in the cuts, and a 1-foot course in the fills. With this added strip the width of the highway was increased from the original 18 feet of 8-inch mesh-reinforced concrete slab to 30 feet; this provided an extra lane for traffic. The widening actually was 13 feet, but the extra foot of base course was included to furnish added support for the pavement and prevent raveling.

The earth work was handled by a Bucyrus-Erie 37-B 1½-yard shovel and a Bay City ¾-yard shovel, the latter rig having its front dipper changed to a ½-yard trench hoe in digging the drainage trenches. Material was transported in a fleet of five Sterling 7-yard trucks belonging to the contractor, and several hired trucks—Federals, Internationals, and Fords—rented on an hourly basis. As the excavation was practically all surplus material, it was distributed out over the fills to widen them.

## Gravel Widening

Gravel for the base course in the widening was obtained from a pit of the Manchester Sand & Gravel Co., about 3 miles from the center of the job. The O. F. Winslow Co. put an Osgood 1-yard shovel in the pit to dig its own gravel. The same trucks as were used in the grading hauled the gravel on an hourly rental basis. The foot of gravel required over the fills was spread in a single course, but the 18-inch layer required in the cuts was spread in two 9-inch courses. Two International tractor-dozers, a TD-18 and a TD-9, spread the gravel that was end-dumped by the trucks. Final shaping was done by two power graders, a Galion 101 and an Adams.

On top of this pit-run material a 4-inch surface course of crushed gravel was spread. From this any stone having a dimension greater than 3 inches was removed. While being spread and shaped, each layer of gravel was rolled

by an Austin-Western 13-ton 3-wheel roller, and an 8-ton tandem Buffalo-Springfield. The gravel was compacted so that it was an inch below the top of the adjoining concrete pavement to allow for the hot-mix base course.

To obtain better sight distance on a vertical curve one 600-foot section of the old pavement was entirely removed and the grade flattened. The big dipper worked under the concrete slab and lifted it into the air, thus cracking it into pieces. Over this stretch the gravel was laid full width. The gradation of the 4-inch gravel surface course met the following specifications:

Sieve Size	Per Cent Passing
2-inch	100
1-inch	50-80
¾-inch	25-50



C. & E. M. Photo

On a section of U. S. 30 in New Hampshire, a Kinney 1,500-gallon distributor mounted on a Ford truck applies T-5 tar preparatory to the laying of a hot-mix course.

The rolled gravel was then given a penetration shot of T-5 tar applied at the rate of 0.5 gallon to the square yard at 150 degrees F. This was done by H. H. McGuire & Co. of Malden, Mass., with a Kinney 1,500-gallon distributor

mounted on a Ford truck, and a Kinney 2,500-gallon distributor on a Mack truck. The tar was loaded from storage tanks in Manchester. On the 13-foot widening the tar was shot with success. (Continued on next page)

## SPEED UP CONSTRUCTION WITH HEAT!



## The Herman Nelson Self-Powered Heater cuts winter "waiting-time"

### can be used for

**SPACE HEATING** of temporary buildings, storage sheds, repair shops, buildings under construction.

**PREHEATING** engines and all kinds of mechanical equipment.

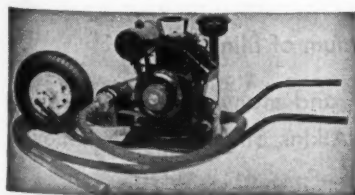
**SPOT HEATING** of materials, workmen, machinery, storage tanks, tools.

**THAWING** frozen areas and machinery, wheels, gears, transmissions, caterpillars, etc.

**VENTILATING** and heating of manholes, tunnels, box cars, ship holds, confined areas of all kinds.

**DRYING** and curing of materials, plaster, paint, mortar, concrete, etc.

Now, for the first time, you can have an independent source of QUICK HEAT—LOTS OF IT, to carry you through many a winter emergency. No more cold weather delays. No more wasting of time. This amazing new heater turns out volumes of fresh, heated air within minutes—enough to heat three ordinary five room houses! Burns gasoline by an entirely different and safe method. No soot. No smoke. No open fires. Simply designed and easily operated. Requires a minimum of attention. The Herman Nelson Self-Powered Heater is a completely self-contained, portable unit—utterly new in principle. Can be easily moved from place to place on the job—by one man.



Complete line of gasoline, pneumatic and electric driven concrete vibrators and grinders. Write for information and prices.

**ROETH VIBRATOR COMPANY**

1737 Farragut Ave.

Chicago, Ill.



**THE HERMAN NELSON CORPORATION**

for 40 years manufacturers of quality heating and ventilating products

**MOLINE, ILLINOIS**





C. & E. M. Photo  
A Burch Chip-It-Over spreader driven by a Briggs & Stratton gas engine and mounted on a Ford truck spreads sand over the freshly applied tar.

## Black-Top Surface Improves Old Road

(Continued from preceding page)

sive applications from 10 and 3-foot lengths of spray bar. Where the full width was covered in the area from which the pavement had been removed, three 10-foot lanes of tar were shot.

The fresh tar was immediately covered with sand by a Burch Chip-It-Over spreader operated by a Briggs & Stratton gas engine. The complete unit hooks on to the back of a truck by means of three hooks and cables which can be raised or lowered by pulleys. The sand also came from the Manchester Sand & Gravel Co. and was spread at the rate of about 20 pounds to the square yard. As the truck backed down the road, the spreader scattered the sand over a path from 15 to 20 feet wide. A wire-brush drag was then pulled over the sand by an International truck, forming a mulch of the tar and sand and filling in any slight depressions in the gravel course. In this way a smooth surface was obtained as a foundation for the asphaltic concrete.

The drag consists of a metal framework, 7 feet wide x 12 feet long, mounted on four small rubber-tire wheels. The framework can be raised or lowered to correspond with the wear of the five brooms—one at each end,

another parallel broom at the center, and two others laid out on diagonals. Bristles are strap wire, 6 inches long x 1/4 inch wide. After the tar and sand were thoroughly worked together, any excess sand was swept off the surface by a Hough rotary broom pulled by a Ford truck, as a preparation for the plant-mix pavement.

### Laying the Hot-Mix

The hot asphaltic concrete was laid 12 feet wide on the gravel widening strip to a thickness of 1 inch, thus bringing the material level with the old concrete. Then the full 30-foot width was covered with three 10-foot lanes of hot-mix 2 inches thick. Any extreme irregularities in the old concrete were smoothed over by first dumping some of the mix from a truck and hand-raking it to level it off. This patching varied in thickness from a 1/2-inch feathering off to 0. The binder and top courses were laid by a Jaeger bituminous paver driven by a Hercules gas engine, and rolled by a 10-ton tandem Buffalo-



C. & E. M. Photo  
As a Chevrolet truck discharges its hot-mix load, a Jaeger bituminous paver lays a 1-inch bituminous concrete base course on the gravel widening strip.

Springfield. Additional back-rolling was done by the 13-ton 3-wheel Austin-Western which for this purpose had an extra roller added immediately be-

hind the front roller.

The black-top came from a commercial plant owned and operated by O. F. (Concluded on next page)

# ATKINS

## "SILVER STEEL" SAWS

**to Keep Up With the Pace of New Building**

Young but famous number of the Atkins line of "Silver Steel" Hand Saws is the No. 2000 Saw... Rugged, keen to cut and keep cutting.

With the tempo of new construction bound to step up to new highs, you'll want to equip your men with saws that will help you keep up with the new pace. The name to remember then is Atkins "Silver Steel." It's the name that stands for the best in saws — in these practical ways:

**Fast cutting**, even on tough jobs, because Atkins saws have the design, the balance, the easy handling qualities that take much of the hard work out of sawing.

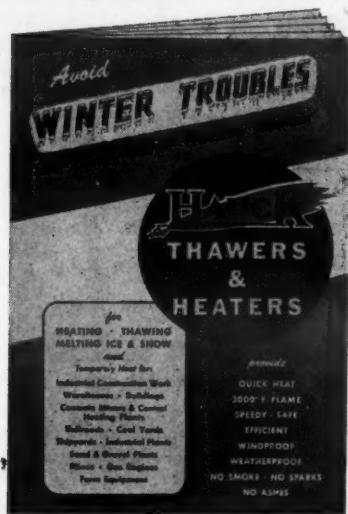
**Keen, tough teeth**, that continue to cut fast and easy for surprisingly long periods, with a minimum of filing.

Have these and many other advantages by saying "Atkins Silver Steel" whenever you buy saws.

**E. C. ATKINS AND COMPANY**  
402 S. Illinois St., Indianapolis 9, Indiana  
Agents and Dealers in All Principal Cities the World Over

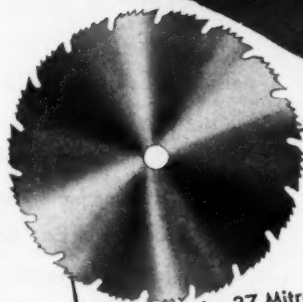
MANUFACTURERS OF BETTER SAWS FOR EVERY CUTTING JOB

## Prepare NOW



Learn how to avoid tieups and delays in winter construction work with Hauck Equipment. This new book is free. Write.

**HAUCK MFG. CO.** 119-129 Tenth St. Brooklyn 15, N.Y.



Atkins Circular Saws

Atkins No. 37 Mitre Tooth Saw shown above is ideal on portable power saws or saw tables. One of a full line of Atkins "Silver Steel" Circular Saws.





## Black-Top Surface Improves Old Roads

(Continued from preceding page)

Winslow Co. and located near Litchfield on State Route 3A south of Manchester, about a 7-mile haul from the job. The asphalt plant had a Cummmer 1-ton pugmill with a rated capacity of 75 tons per hour. From 4 to 6 trucks, Fords and Chevrolets, averaging 8 tons each delivered the hot-mix to the job at a temperature of from 240 degrees F. The paver operator kept his machine on line while laying the outside lane by watching a string which was stretched 6 inches outside the edge of the pavement. Later, after the rolling, a man with a square-edged shovel trimmed off the black-top to a neat line by measuring back 6 inches from the string. With the paver doing practically all the work a force of only 5 men was required to lay the hot-mix. One man operated the machine; two others, one on each side, looked after the adjustment of the wings and did whatever raking was needed; while the other two dumped the trucks and did any necessary shoveling. Behind the paver the surface was checked continually with a 10-foot straight-edge. The workers' tools were kept clean with a kerosene torch carried along on the paver.

The gradation of binder and wearing courses in this type I-1 asphaltic-concrete pavement is as follows:

Sieve Size	Per Cent Passing	
	Binder Course	Wearing Course
1-inch	100	....
¾-inch	90-95	....
½-inch	50-80	100
No. 4	25-40	35-75
No. 10	15-35	30-50
No. 20	15-35	24-45
No. 40	8-25	10-40
No. 80	....	5-19
No. 200	....	2½-5
Asphalt (penetration 85 to 100)	4-6½	5-7½

Traffic was maintained during all operations including the laying of the hot-mix. The finished pavement has a crown of ¼ inch to the foot and is flanked by 5-foot shoulders. Fill slopes are 4 to 1, while those in cuts are 1½ to 1.

### Items and Personnel

The major items of the contract on which four bids were received include:

Excavation	23,680 cu. yds.
Gravel	13,743 cu. yds.
T-5 tar	16,000 gals.
Asphaltic-concrete pavement	4,865 tons
Plain concrete pipe, 10-inch	1,500 lin. ft.

Andrew Elliot was Superintendent for O. F. Winslow Co. with a total force of 23 men. Stanley Morril was Resident Engineer for the New Hampshire State Highway Department, assisted by R. W. Webb. The Department is headed by Frederic E. Everett, Commissioner, with D. H. Dickinson, Chief Engineer, and Robert Whitaker, Construction Engineer.

### Extruded Flux Coat On Hard-Facing Rod

For hard-facing heavy equipment which is subject to earth abrasion and impact, the Stooddy Co. has announced an improved electrode. The rod has an extruded flux coating which is said to improve its welding characteristics and simplify its application.

The electrode is a fabricated rod consisting of mild-steel tubes filled with alloying elements. The coating is applied to the rod by a hydraulic extrusion press. The rod has an average Rockwell C hardness of 56. The melting point is 2,525 degrees F, and the specific gravity, 7.80.

Excellent arc characteristics with either ac or dc machines, no slag interference, a rapid deposition rate, and no loss of hardness or wear resistance on multiple layers are features of the elec-

trode, Stooddy says. Usable in all positions, it leaves solid, dense deposits, giving satisfactory application within a wide range of amperages, the firm claims. Any type of bead can be applied.

Four rod sizes of this improved Stooddy Self-Hardening electrode are available: ⅜, 5/32, 3/16, and ¼-inch. The product is described in a bulletin Stooddy will send you on mention of this notice. Just write the firm at 1136 W. Slauson Ave., Whittier, Calif.

### Pierce Governor Co. Buys King-Seeley's Servo Line

Production rights, tools, and inventory of the Servo line of engine governors have been purchased from the King-Seeley Corp. of Ann Arbor, Mich., by The Pierce Governor Co. Pierce will move the manufacturing of the centrifugal governors to its plant at Anderson, Ind.

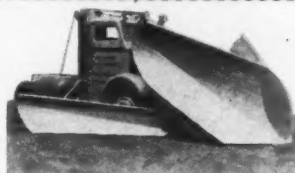
The new owner will continue the Servo line under that name for engine

makers and users. The Handy-Servo distributor organization, as well as parts and factory services, will remain, and will follow the policies used by King-Seeley.

Eventually Pierce looks forward to integrating production of its own governor lines with those of Servo. This will provide interchangeability between the two lines where replacement parts are concerned.

### Shop Clamping Tools

Small shop and job tools are shown in a 39-page folder put out by the Grand Specialties Co., Grand Ave. at Troy, Chicago 22, Ill. Vises, C-clamps, bar clamps, V-jaws, and wrenches are among the items shown. You can obtain copies of Form 4512 describing the quick-action, time and labor-saving features of these tools from the firm.



### There's Always a BEST WAY

That goes for snow clearance, too. It's no mere accident that

#### DAVENPORT-FRINK SNO-PLOWS

enjoy engineer-preference throughout the snow belt. They have won their spurs through Faster • Safer • Cleaner Snow Removal.

#### ACT PROMPTLY

We'll be glad to give you complete information—the sooner the better, because, frankly, there'll be a waiting list. The early bird will get the Sno-Plow—and repair parts—unless steel starts coming through at a much faster pace.

ALL SIZES and TYPES for TRUCKS • TRACTORS • MOTOR PATROLS

### DAVENPORT BESLER CORP.

Dept. A

Made in Eastern U.S.A. by CARL H. FRINK, 1000 Islands, CLAYTON, NEW YORK

Davenport, Iowa



There's a  
**CHEVROLET**  
**TRUCK** to do your  
hauling jobs

### 99 MODELS ON 9 WHEELBASES

Newly added models, of greater payload capacity than in previous years, now make available Chevrolet's famous operating economy, low upkeep and low first-cost to a still greater range of users in the heavy hauling field. Chevrolet trucks formerly classed as heavy-duty models are now Chevrolet medium-duty models; the new models that now make up Chevrolet's heavy-duty class comprise five

series, with five wheelbases (from 109 inches to 160 inches), and include both conventional and cab-over-engine types. All are equipped with vacuum-power brake boosters and with new wide-base-rim wheels.

Operators of trucks in extra-heavy hauling jobs will cut costs three ways by using these massive Chevrolets . . . for they cost less to buy, less to run, less to keep.

CHEVROLET MOTOR DIVISION, General Motors Corporation, DETROIT 2, MICHIGAN

SEE YOUR CHEVROLET DEALER. HE CAN SUPPLY YOU WITH CHEVROLET STANDARD TRUCKS AND SPECIAL EQUIPMENT FOR ANY HAULING JOB

## CHEVROLET TRUCKS



PICK-UPS



PANELS



STAKES



CAB-OVER-ENGINE



TRACTOR-TRUCKS AND CHASSIS FOR SPECIAL EQUIPMENT



99 MODELS • 9 WHEELBASES • THE RIGHT TRUCKS FOR ALL TRADES



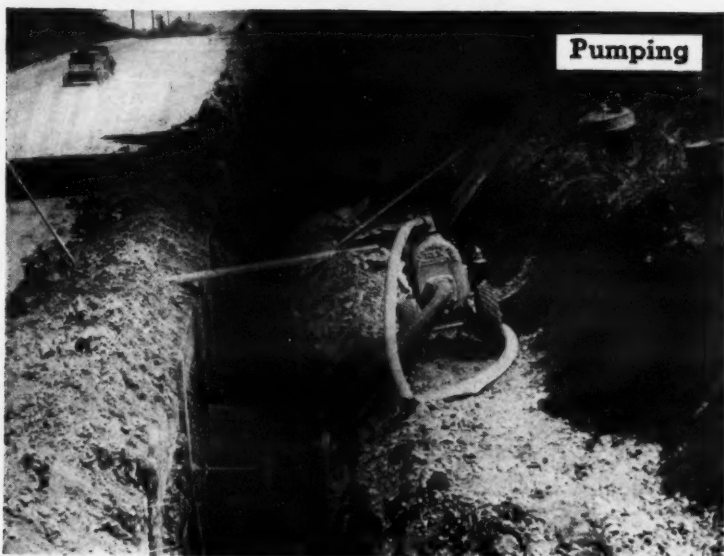
# Laying a 34-Mile



**Excavating**

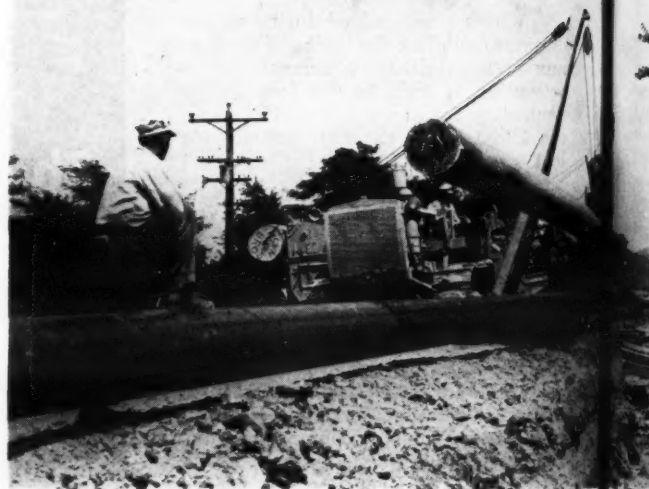


Excavation for the 36-inch-wide trench to carry 34 miles of 18-inch pipe was handled, for the most part, by an Austin trencher powered by a Waukesha engine (at left). Minimum depth was 5 feet 6 inches and the maximum, at the time these photos were taken, was 11 feet. Nash Bros. & Associates of Chicago, contractor for the project, also used an Austin-Western Badger trench hoe for some of the trenching operations.



**Pumping**

In spite of a prolonged drought in Illinois while this work was in progress, seepage water in some locations required pumping and shoring to prevent bank cave-ins. At left, a Rex portable pump unwaters a section of the pipe trench.



Youngstown pipe in 50-foot lengths was delivered to the job by trailer. There a Caterpillar tractor with side boom (shown below) maneuvered the pipe into position. The tractor also hauled a portable compressor which furnished the air for blowing dirt, rust, and scale from the pipe before it was tacked together.

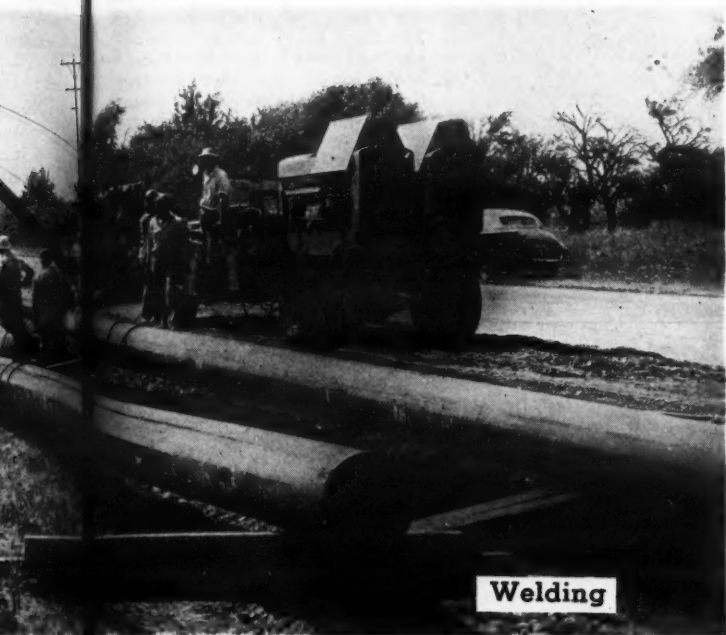


**Pipe Handling**





# Mile Pipe Line



**Welding**

Above, two Lincoln welders, truck-mounted for mobility, are being used to tack pipe together preliminary to final welding. Seven welding machines and operators handled the entire job. A pipe-bending machine provided proper ground contour.



**Cleaning**

A cleaning machine to brush the outside of the pipe and apply the Bitumastic coating was held in place by two Caterpillar tractors (at left). Installation of this pipe to carry natural gas averaged about 2,500 feet per day.



**Coating**

A "doping" machine (below) followed the cleaning operation, wrapping and coating the pipe. The pipe seen at the right is all arc-welded, wrapped, and coated. Asbestos-felt wrapping and Bitumastic pipe-line enamel were used for this job.



**Pavement Breaking**

Where the pipe line crossed intersections, the pavement had to be broken up to permit the trench hoe to get on with its excavating. Access to the intersecting road in the photo above was provided by heavy planking covered with earth.



**Backfilling**

An Allis-Chalmers power grader handled the backfilling (at right). Fill sand was placed directly on top of the pipe, compacted, and then the roadside material added for final compaction. The grader removed the excavated material down to the pavement; brooms were then used to clean off the remaining dirt and dust. Up to 50 per cent of the trench dirt was hauled away. Doetsch Bros. of Evanston handled this part of the work and furnished the fill sand.



**Compacting**

A special compacting device was built for this project. It consisted of a 7-ton sheepsfoot roller 7 feet in diameter and 30 inches wide, made by the Hudson Machine Works. A standard Cummins 14-foot live boom with two horizontal booms, ahead and behind, mounted on a Caterpillar Sixty tractor, pulled and guided the roller.

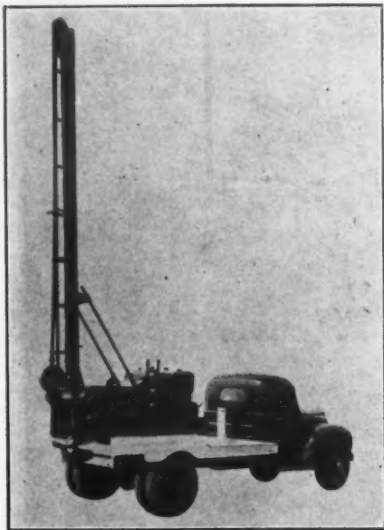


**Finishing Up**

Here a Dodge truck dumps a load to fill in a low spot on the compacted backfill. This 34-mile pipe-laying job was started August 1 and was scheduled for completion by November 1. Many of the members of the crew for this project were experienced pipe-line workers from Oklahoma and Texas.

(Photos by Blaine Britton)





The new line of Williams post-hole rotary drills is designed for speedy and economical drilling of vertical or inclined holes 8 to 36 inches in diameter, in depths from 1 to 20 feet.

### Post-Hole Drill Has a "Power Crowd" Feature

The use of a "power crowd" feature, by which the full horsepower of the engine and the unit's weight are utilized to "crowd" the drill bit into the earth, marks a new post-hole drill announced by the Hugh B. Williams Machine Shop.

The new rotary drill is designed for digging holes for fence posts, power-line poles, and the like, in all types of hard or clay earths. It will dig inclined or vertical holes, 8 to 36 inches in diameter, in depths from 1 to 20 feet, depending on the drill model.

Mounted on the rear of a 1½-ton dual-wheel truck or larger, the drill is supplied with an International, Allis-Chalmers, Waukesha, or Le Roi engine as power source. Standard equipment includes a 9-inch and an 18-inch bit.

Full facts about the new Williams post-hole drill are included in descriptive bulletin No. 746, which the firm will send on mention of this notice. Write the Hugh B. Williams Machine Shop, 2946 Oak Lane, Dallas 10, Texas.

### Expansive Wood Bit Handles Heavy Boring

An entirely new principle in wood-boring tools has been claimed by Bruno Tools for a heavy-duty expansive bit designed with a straight shank for use in electric drills or drill presses. The new tool bores 1½ to 3½-inch holes in wood.

The center lip of the bit cuts away the core at the center of the hole. It extends back to form a clamp which holds the adjustable blade at the set diameter. A screw locks the clamp. An improved screwpoint assures steady advance of the bit through the work. Two cutting blades, a long and a short one, are supplied to cover the tool's range. Each has a graduated scale for adjustment.

Full details about this new Bruno tool can be obtained from the firm on mention of this news item. Write to the company, Dept. 221, at 9330 Santa Monica Blvd., Beverly Hills, Calif.

### Portable Power Plants

Portable gas-electric generator plants in twenty-two basic sizes, from 500 to 17,000 watts, and in many different types to meet ac or dc power and lighting requirements, are shown in a 40-page and an 8-page catalog issued by the Master Vibrator Co., P.O. Box 657, Dayton 1, Ohio.

Advice on the selection of such power units, photographs of their use, pictures and diagrams of the various models, and complete specifications feature catalog Nos. MV-594 and MV-815. Master Vibrator Co. will be glad to send them on mention of this notice.

### Prof. Lane Rejoins U.S.B.R.

E. W. Lane, formerly professor of hydraulic engineering at the University of Iowa, has rejoined the Bureau of Reclamation Staff, the Department of Interior has announced. He will serve as hydraulic consulting engineer. Mr. Lane spent several years in China with an engineering company and was associated with the Bureau of Reclamation from 1929 to 1935.

### Welding Information

Welders will welcome a rod-selector chart just put out by the Eutectic Welding Alloys Corp. for posting on shop walls. The chart measures 18 x 23 inches. In addition to listing the recommended Eutectic rods for specific tasks, the chart gives information on the properties of welds and on welding procedures.

Copies of this handy wall chart can be secured from the firm at 40 Worth St., New York 13, N. Y.

Beat Hand Sawing  
Ten to One . . . .



Van Dorn Portable Electric Quick-Saws\* save money, muscle and man-hours on every construction sawing job. They finish jobs ten times faster than by hand. Rip, crosscut, miter, dado. Cut wood, compo-board, slate, tile, marble, asbestos, galvanized sheet. Models for cutting to depths of 2⅜", 2⅝", 3⅞". Ask your nearby Van Dorn Distributor or write for our free "Electric Quick-Saw Handbook" to: The Van Dorn Electric Tool Co., 787 Joppa Road, Towson 4, Maryland.

\*Trade Mark Reg. U. S. Pat. Off.

"Van Dorn"

For Power Specify

PORTABLE ELECTRIC TOOLS



65 MINUTES  
in an hour...?

Obviously,  
... no

**ADJUSTMENTS**, because they are all easy to make and last once you make them;

**MAINTENANCE**, because machinery arrangement is simple and accessible, and because balanced minimum-stress performance means few repairs;

**LUBRICATION**, because fittings are easy to reach, difficult to overlook;

**MOVES**, because the simple, efficient caterpillar mounting and the easy steering combine to permit fast maneuvering on the job;

But by taking advantage of the extra working time you get every hour of every shift with Bucyrus-Erie ¾- to 2½-yard excavators, and measuring time in terms of output, you get a similar effect. With Bucyrus-Eries you "expand" each hour by saving time on:

**OPERATING**, because the controls give "full feel," are easily operated, and are all conveniently grouped so that the operator does not need to leave his position.

That means more time to put to work really outstanding digging ability — the result of design that combines the best performance features developed in Bucyrus-Erie's long experience in manufacturing excavators. Quickly convertible in the field, Bucyrus-Eries are equally effective as shovels, draglines, clamshells, or cranes.

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most of  
**EVERY HOUR**  
with a  
**BUCYRUS-ERIE**

BUCYRUS  
ERIE

SOUTH MILWAUKEE, WISCONSIN



# Operations Are High-Gear'd On Concrete-Paving Project

## Coordination of Activities On \$750,000 10-Mile Job Speeds Completion Within 90-Day Time Limit

+ TWO busy pavers ground out an average daily total of 3,400 square yards of concrete paving as Fielding & Shepley, Inc., St. Paul, geared all construction activities to completion of a 10-mile Minnesota concrete-paving project within the specified time limit of 90 working days.

The \$747,459 contract included two 22-foot lanes of divided concrete roadway on Trunk Highways 10 and 3 from Elk River to Big Lake. The project extends, for another 10 miles, the two-lane separated highway which reaches northwest from the Twin Cities on the most heavily traveled route to the Rockies and the Pacific coast.

Bids on the project, which included a large amount of grading, were opened on May 10 by M. J. Hoffmann, State Highway Commissioner and President of the American Association of State Highway Officials. The low bid of \$747,459 was submitted by Fielding & Shepley, Inc., and the contract was subsequently awarded to that firm.

For O. W. Swanson, Vice President of Fielding & Shepley, Inc., and a past President of the Associated General Contractors of Minnesota, this contract marked the second "first" in an outstanding construction career. In 1930 as superintendent for Nolan Bros. of Minneapolis, Mr. Swanson had supervised laying the longest section of concrete pavement—56 miles from Wayzata to Litchfield—yet awarded by the State Highway Department.

The award of the \$747,459 contract for concrete paving between Elk River and Big Lake to Mr. Swanson's firm in 1946 marked the second "first"—the winning of the biggest paving contract awarded by the Minnesota State Highway Department to one contractor.

### Division of Work

Some time elapsed between the opening of bids on May 10 and issuance of a work order for the project. It was not until June 11 that the contractor was told to proceed. The contract extended through two towns and involved relocation and reconstruction as well as new paving over previously prepared subgrades and new subgrades. It totaled some 66 separate items. Grading amounted to 475,000 cubic yards, and pavement and sidewalk removal to almost 25,000 square yards. Production of aggregate for the 200,000 square

yards of single-course 9-7-9-inch concrete paving was a major item. Fielding & Shepley, Inc., decided to concentrate its efforts on the concrete paving and to sublet most of the other work.

Otto Ashbach of St. Paul was awarded a subcontract for all dirt work, with the exception of fine grading; the Hallett Construction Co. of St. Peter was given the job of producing all aggregate needed for concrete. Fielding & Shepley, Inc., decided to produce with its own equipment the 16,000 cubic yards of aggregate for bituminous surfacing at intersections and for graveling shoulders.



C. & E. M. Photo  
Conveyors feed sand and crushed rock from the washer to the 30-yard bins designed and built by Hallett Construction Co. of St. Peter, which subcontracted to produce all aggregate for the concrete.

### Dirt Work

The contract was somewhat complicated by the fact that a few sections of the new grade had been completed several years ago and were supposedly ready for fine grading. Other sections called for new grading and fine grading. At one railroad overpass where approaches were to be raised and widened, a borrow area included 180,000 cubic

yards of excavation.

Over the 10 miles, 4 miles of completely new grade was necessary; one lane of the highway had been practically completed for 3 miles; an old lane was incorporated into the design for 4 miles; and over the other sections, work consisted of pavement removal, regrading, and shaping up in

(Continued on next page)

## Urgent Demand for Veteran Housing Means Allocation of Douglas Fir Plywood

TODAY, a substantial proportion of Douglas fir plywood production is allocated by order of the Civilian Production Administration to the Reconstruction Housing Program. Housing contractors, stock cabinet manufacturers, prefabricators and distributors must be supplied first — and this means a temporary shortage for all other industrial and construction users. But MORE plywood is being produced today than in pre-war years. When the present demand is met, an increased supply will be readily available. So — anticipate your needs as far in advance as possible. Keep in touch with your regular source of supply!



### These "Grade Trade-Marks" Are Your Assurance of Uniform Quality Standards

There is a type and grade of Douglas fir plywood for every building need. Each MUST meet rigid performance tests — in the field and in the Douglas Fir Plywood Association Laboratory. Choose the type you need by these "Grade Trade-Marks" — stamped on every panel.

#### EXT.-D.F.P.A.

EXTERIOR-TYPE plywood is made with completely waterproof synthetic resin binder especially for permanent exposure to weather and water. It is widely used for building exteriors, for outdoor signs, for railroad car siding, and in all phases of marine construction.



PLYSCORD is an unsanded utility panel of unusual rigidity, made to withstand the rigorous service demanded of wall and roof sheathing and of sub-flooring.



PLYWALL is the grade of interior-type plywood made for use where only one side is exposed, as in wall paneling. It is suitable for most stained finishes, for painting or papering.



PLYFORM is the special concrete-form grade of Douglas fir plywood — a quality grade manufactured with highly water-resistant glues and intended for multiple re-use in form construction.

#### PLYPANEL D.F.P.A.

PLYPANEL is the grade of interior-type plywood made especially for high quality interior work on walls, ceilings, for booth partitions, cabinet doors and similar uses.

DOUGLAS FIR PLYWOOD  
Tacoma 2, Washington

DOUGLAS FIR PLYWOOD  
LARGE, LIGHT, STRONG.  
Real Wood PANELS

ASSOCIATION

## National Carbide FLOOD LIGHTS

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Simple in construction

Economical in cost

Dependable in operation

Available in 1,500, 8,000 and 16,000 candlepower units

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## Operations Geared For Speedy Paving

(Continued from preceding page)

preparation for paving.

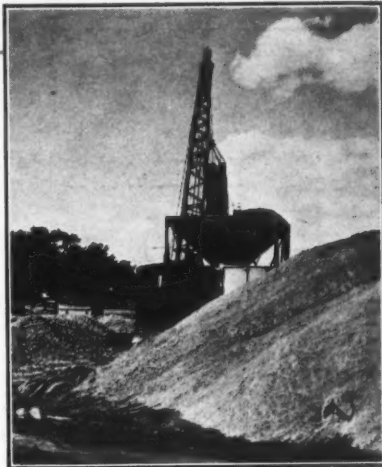
The Ashbach subcontract quantity sheet read like a major job in its own right. Principal items included the following:

Clearing	23	acres
Grubbing	27	acres
Pavement removal	22,483	sq. yds.
Sidewalk removal	1,479	sq. yds.
Class A excavation	8,810	cu. yds.
Class C excavation	463,239	cu. yds.
Special swamp excavation	1,857	cu. yds.
Binder soil in place	1,292	cu. yds.
Stabilizing	43,071	sq. yds.
Random riprapping	740	cu. yds.
Seeding	72.4	acres
Area sodding	18,107	sq. yds.

Work was started on the project on June 11 with crews of the three construction firms cooperating to ensure the smooth and continuous flow of activities so necessary to a large project with a short time limit. Ralph DeSantis, Superintendent for Ashbach, had three prime objects in mind as the dirt equipment arrived at Elk River and Big Lake by truck from St. Paul: first, he must get the scrapers and dozers operating on the sections of new grade; second, he must get his equipment working on the old grade where reshaping and stabilizing were necessary; and third, he must quickly get old paving and sidewalks removed at Elk River so the new highway could be placed in use as soon as possible to relieve traffic congestion.

A crew of ten men and a foreman moved out in the brush with hand tools to clear and grub before the graders. Light to heavy timber growth which could not be readily removed by hand was cleared with a Lombard gas-powered saw and two Caterpillar D8 tractors with LeTourneau bulldozers.

Principal new grading extended from a railroad overpass for a distance of about 4 miles to Big Lake. Into this section went Otto Ashbach's big dirt movers—6 Tournapulls with 10-yard Carryalls; 2 Caterpillar D8's with 12-yard LeTourneau scrapers; 2 Caterpillar D7's and a Caterpillar D8 with bulldozers; an Allis-Chalmers with bulldozer; and a Caterpillar D8 and 2 Cletrac "snatch cats". The light, sandy soil made "pull" assistance for the scrapers more desirable than "push" assistance, so the two Cletracs and the Caterpillar D8 were fitted with cables



C. & E. M. Photo  
A Speedcrane 1 1/4-yard dragline loads a 60-ton Johnson batcher with sand and crushed rock which was trucked in and stockpiled.

which hooked to the power units on the scrapers and speeded loading.

The 25,000 square yards of pavement and sidewalk removal was located near the business districts of Elk River and Big Lake. A Lorain 3/4-yard shovel broke down, or rather, wore down the concrete and loaded it to trucks. Much of the concrete pavement and sidewalk removed was used to fill in a swampy area on the new route just out of Elk River and in a lake fill at Big Lake. Besides the pavement and sidewalk removal, the Lorain saw service in a borrow pit at Big Lake. There it loaded 40,000 cubic yards of material for the 30-foot-deep submerged fill across Big Lake.

Another item in the Ashbach subcontract was 43,071 square yards of stabilization. The soil over much of the 10-mile section is sandy and light. At locations where stabilization was considered necessary by the State Highway Department Project Engineer, Fay Baker, clay removed from a borrow pit near the Big Lake end of the job was mixed with the sand by disk. Stabilizing was to a depth of 4 inches; the

sand and clay was watered, then compacted by sheepfoot and pneumatic-tire rollers.

### Aggregate Production

The Hallett Construction Co. averaged 800 cubic yards of sand and crushed rock a day for the dry batch. Robert Howes, Hallett's Superintendent, moved a crusher and washer to a borrow area on a sandy hill about 3 miles from the highway in mid-June. There he set up facilities to keep aggregate production ahead of mixer requirements.

Hallett is a well known name in the northwest, and the firm is prominent not only as a highway contractor but also as a producer of crushed rock and washed gravel. Much of the equipment used by the Hallett Construction Co. either is built by the firm to its own specifications or is a combination of the best features of standard equipment on the market. The crushing and washing plant set-up used by Hallett on this

(Continued on next page)

## Why a **BG** Ditcher can cut through hard material

● Just as a milling head steadily cuts through a piece of steel, so does the Barber-Greene Ditcher mill through tough materials. The closely spaced buckets, each taking small, even bites, travel at a high rate of speed, giving a milling action against the digging face. The vertical boom, exclusive with Barber-Greene Ditchers, causes the buckets and digging teeth to pull straight up against the work.

Frozen ground, coral rock, caliche—these are some of the hard materials through which Barber-Greene Ditchers have successfully and economically cut.

Catalog 44 describes and illustrates the many mechanical features and models of these versatile ditchers. Obtain a copy from your Barber-Greene distributor or write direct to Barber-Greene Company, Aurora, Illinois.



## Digs 600 Holes a Day

For Foundation Footings . . . Highway and Industrial Fencing . . . Rural Telephone and Light Poles . . . Airports . . . Cemeteries . . . Holes for Dynamiting, etc.



## SPEEDIGGER

Quickly mounts on all row crop tractors; also available for all crawler-type tractors. Drills at any angle, up to 54° deep. Standard auger sizes from 4" to 12".

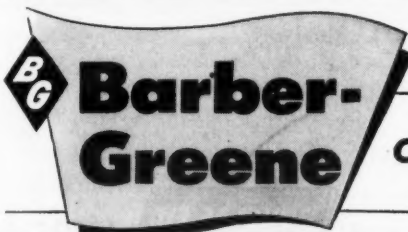
Operator stands on platform, behind protective handrail . . . out of dirt . . . away from moving parts. Built extra strong for toughest digging operations. Drills through hard dirt, frosted ground, roots and gravelly soils. Thousands in use by state highway departments, utility companies, U.S. Gov't. engineers, etc. Thoroughly proved. Guaranteed.

WRITE for details and prices . . . available now . . .

R. J. PIPER MANUFACTURING CO.

Princeton, Illinois

New York Office: 100 E. 42nd St.



CONSTANT FLOW EQUIPMENT



LOADERS • PERMANENT CONVEYORS • DITCHERS • PORTABLE CONVEYORS • FINISHERS • BITUMINOUS PLANTS • COAL MACHINES



## Operations Geared For Speedy Paving

(Continued from preceding page)

contract was a combination of its own and commercial equipment.

The crusher, which ran 140 tons of rock per hour, had a 15 x 36 Diamond primary crusher with a 100-hp Waukesha engine. The secondary was a 3-inch Symons cone crusher with a 60-hp Waukesha engine, while the vibrator was a Simplicity with 2-inch and 3-inch screens. A 30-inch 100-foot rubber conveyor extended from the sump to the screens, and a secondary conveyor on the crusher returned oversize to the primary crusher.

From the crusher, sand and gravel were run through a washer designed and built by Hallett. The washer, which had a capacity of about 150 tons per hour, was equipped with a Diamond vibrating screen and a 60-hp Waukesha engine. From the washer, two 60-foot conveyors extended to two steel bins designed and built by Hallett. The conveyor for sand was 24 inches wide and the conveyor for rock, 20 inches wide. Each bin had a capacity of 30 cubic yards.

Water for the washer was pumped from the Elk River some distance away. At the river, a Fairbanks-Morse 8-inch pump with a Caterpillar 60-hp engine pumped to the washer through 1,000 feet of 12-inch spiral pipe. Discharge from the washer, located on a hilltop, returned by gravity to the stream.

In the gravel pit a 1½-yard North-west alternated between use as a drag-line and as a shovel, depending on the material. Three 5-yard trucks in the pit made one round trip every 5 minutes from the Northwest to the sump. Roots, boulders, and foreign material were hand-picked from the conveyor to the crusher.

The crew at the washer and crusher worked from 5 to 11 hours per day, depending on the amount of concrete placed by the pavers.

Fielding & Shepley's batching plant was located on a railroad siding about 2 miles from the Hallett gravel plant, and thirteen rented 5-yard trucks hauled the rock and sand to the batcher. Each truck averaged three round trips per hour.

### Batching Plant

From the batching plant to the finished slab, all operations were handled by Fielding & Shepley, Inc., and supervised by its Superintendent, Nels Nelson of Zimmerman. The batching plant was located about ½ mile from the highway on a railroad siding, with a maximum haul of 5½ miles to either end of the job.

Two 60-ton Johnson batchers with scales were set up at the area to handle the sand and crushed rock which was trucked in and stockpiled from the



C. & E. M. Photo

Fielding & Shepley, Inc., of St. Paul, used this Cedarapids Junior Tandem crushing plant to produce ¾-inch material for bituminous surfacing on parts of its 10-mile concrete paving job.

Hallett crusher and washer. The Johnson bins were filled by a Speedcrane 1¼-yard dragline and a Koehring 303 ¾-yard dragline.

Penn Dixie, Universal Atlas, and

Huron cements were delivered in bulk to the siding. Trucks arriving from the pavers for loads made a circuit of the area, receiving first their weighed batches of sand and crushed rock and

then their buggy loads of bulk cement which was weighed by hand scales.

Four per cent air-entraining was specified for concrete on this project by the State Highway Department. When the mix ran below, Darex admixture was added to the loads at the batching plant. Otherwise, the air-entraining agent was ground into the cement at the mill—Darex with Penn Dixie and Huron cements, and Vinsol Resin with Universal Atlas.

Fielding & Shepley rented twelve 5-cubic-yard trucks to haul the dry batch a maximum of 5½ miles from the batching plant to the pavers. Each truck carried two batches of 38 cubic feet.

### Paving

The contractor employed two pavers on this job, a new MultiFoote 34-E and a Rex 27-E. The MultiFoote 34-E was used on all 22-foot standard highway pours, and the Rex 27-E was used for widening and small pours, working only

(Concluded on next page)

YOU'LL NEVER SEE A DISTRIBUTOR  
OPERATE AS EASILY  
AS A "SPRAY MASTER"

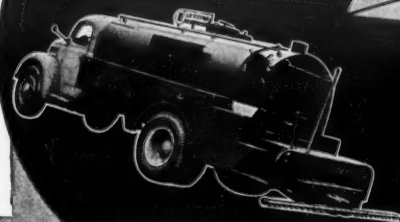


With Vacuum-Flow Full Circulating Spray Bar the "Spray Master" sprays material at desired Spray Bar Width.

The "Spray Master" will apply Bituminous material to any Road, Street or Highway with the least amount of effort and less operating cost than any unit of its kind. No matter what width spray bar is desired up to 24 feet the "Spray Master" just puts the material down like a carpet. With the Vacuum-Flow Full Circulating Spray Bar, the individual nozzles can be turned off giving the desired spray bar width for the job. The operator turns the Single Control Valve to "Spray" and instantly the most efficient spray job is under way. When the end of the job is reached, the operator turns the Control Valve to "Fill" and the spray stops instantly. Circulating by Vacuum eliminates any pressure on the spray bar assuring an instant cut off of spray. Make your next unit a "Spray Master," the Master of Bituminous material Spraying.

Above—"Spray Master" with Standard 2" tubular Spray Bar with engine mounted at the Rear.

Below—Front engine "Spray Master" with controls at rear. Choice of Front or Rear Engine can be had.



### "WHEN YOU CAN'T WAIT FOR FACTORY DELIVERY OF YOUR HYDRAULIC HOSE ASSEMBLIES—"

Just use two automotive wrenches and a vise (if available) for attachment of ANCHOR EMERGENCY REPAIR AND FIELD SERVICE COUPLINGS to high pressure hydraulic hose. These reusable couplings are designed for easy assembly and their grip outlasts the hose. Two heavy duty clamps secure the coupling stem to the hose. New parts not necessary to make coupling replacement.

Standard pipe thread couplings available in stock for high pressure hydraulic hose ¼" I.D. through 1" I.D. inclusive.

Send your hydraulic hose and coupling inquiry.

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LIBERTYVILLE, ILLINOIS

Factory Branch

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**LITTLEFORD**

**LITTLEFORD BROS., Inc.**

485 E. PEARL ST.,

CINCINNATI 2, OHIO



## Operations Geared For Speedy Paving

(Continued from preceding page)

one or two days a week. The Multi-Foote ran from 46 to 48 batches an hour for a total of about 3,000 square yards in a 10-hour shift.

The fine-grade crew of five laborers and two operators generally preceded the pavers by about 700 to 800 feet. Fine-grading was done by an International TD-40 tractor with an Ateco scraper and Bucyrus-Erie bulldozer; a Caterpillar No. 11 motor grader; and a Cleveland subgrade planer pulled by either the tractor or grader.

Metaform road forms were used for both pavers with 2,250 road feet of forms used with the MultiFoote paver and 1,000 road feet of forms with the Rex. The forms were lubricated by hand just ahead of the pavers and were pulled every night.

A Ford and a Chevrolet flat-bed truck, each equipped with a 1,000-gallon tank, were filled from the Elk River by a Jaeger 4-inch centrifugal pump, and the subgrade was sprinkled at night for the coming day's paving run. The subgrade was sprinkled again by hand hose at the paver just before the pour. Water for the concrete mix was hauled by the Ford and Chevrolet trucks to the pavers.

The 34-E paver pulled a Cleveland planer, and was followed by a Jaeger spreader with screed in back, a Blaw-Knox electric finishing machine, a Koehring Longitudinal Finisher, and a joint cutter designed and built by the contractor. A mastic transverse joint  $\frac{1}{2}$  inch thick was placed to a depth of 2 inches by hand after the cut.

The concrete was cured with Kapco liquid membrane curing compound, applied by spray from a bridge mounted on the road forms. State Highway Department specifications permitted the contractor a choice between paper or liquid membrane curing, and Fielding & Shepley selected the liquid membrane cure as quicker and easier to apply. The curing compound was applied at the rate of a gallon to every 200 square feet of concrete.

### Bituminous Surfacing

Street intersections, crossovers, and a part of the shoulders along the newly paved highway were given a treatment of bituminous surfacing which totaled 41,838 square yards for the entire project. The bituminous surfacing required 13,432 gallons of bituminous material for prime MC-0 or RT-2, and 66,941 gallons of bituminous material for mix (RT-6 or 7, or MC-3 or 4).

The 4,185 tons of aggregate used for bituminous surfacing was taken from a pit about  $\frac{1}{2}$  mile north of the road near the center of the project. In this pit, Fielding & Shepley, Inc., set up a Cedarapids Junior Tandem 10 x 36 jaw crusher, another new piece of equipment used for the first time by the contractor on this project. The crusher had a 10-inch grizzly and  $\frac{3}{4}$ -inch screen and was powered by an International diesel. A Speeder  $\frac{3}{4}$ -yard shovel excavated material which was carried to the crusher by a 40-foot conveyor. The crusher produced an average of 100 cubic yards per hour, and three trucks hauling 5 cubic yards per load stock-piled some 16,000 cubic yards of  $\frac{3}{4}$ -inch material along the highway from this pit.

### The New Road

The new highway provides through traffic to the northwest with two lanes of 22-foot concrete paving for 10 miles beyond Elk River, where the 2-lane highway from the Twin Cities formerly terminated. The new highway lanes are separated by an island varying in



C. & E. M. Photo

A general view shows equipment line-up, from the MultiFoote paver to the contractor's own joint cutter, on the \$747,459 contract for the divided concrete roadway from Elk River to Big Lake, Minn.

width from 4 to 53 feet. In the towns where there is no island, the pavement attains a maximum width of 71 feet.

Including some new grade construction and reconstruction of the old road at several areas, the new highway

eliminates several bad curves, including one reverse curve on the old road at the northwest edge of Elk River. The new road also skirts the business section of Elk River, reducing the mileage by approximately  $\frac{3}{4}$  mile.

### Personnel

The prime contractor and the two subcontractors employed a total of 181 men on the project, working a 10-hour shift 6 days a week. Practically no time was lost, especially on concrete operations, because of weather.

Personnel on this \$747,459 contract included Fay Baker, Project Engineer for the Minnesota State Highway Department; and for Fielding & Shepley, Inc., Nels Nelson, Superintendent; F. McGuire, Mixer Foreman; Ray Gerst, Construction Engineer; Ray Thompson, Fine-Grade Foreman; Cliff Nelson, Sewer, Curb, and Gutter Foreman; and Art Kimmet, Crusher Foreman.

Ralph DeSantis was Superintendent for Otto Ashbach on dirt work, and the Superintendent for the Hallett Construction Co. at their washer and crusher was Robert Howes.

**SNOGO** gets the kids to school

and back!

Snow clearance even affects education! 96% of the one-room schools, many of which should be abandoned for consolidated schools, are on other than main roads often impassable in winter.

Your county properly equipped with Snogos can keep these roads open, eliminate banks that drift back and entail extra cost and time in "repeat plowing".

Sngo assures open winter roads bringing greater safety for the 80 to 90 thousand school busses that average 25 miles a winter day transporting 4,400,000 young Americans. Sngo means that your children and your neighbors' children get to school and back.

There is a Sngo for every county, state and city budget. Plan ahead to improve winter highway conditions in your area. Details on request.

**KLAUER MANUFACTURING COMPANY**  
DUBUQUE, IOWA

**SNOGO** A SNOGO For EVERY BUDGET

Clear Winter Roads  
MORE BUSINESS AND MORE JOBS!





The new Simplex 2522 heavy-duty jack is designed for a variety of lifting, lowering, and supporting jobs.

### New Jack Will Lift 25 Tons 10 1/4 Inches

Designed originally for bridge work, but applicable in many other heavy-duty lifting jobs, a new Simplex ball-bearing jack has been announced by Templeton, Kenly & Co. The jack has a 25-ton capacity and will lift up to 10 1/4 inches.

Weighing 140 pounds, the new Simplex handles high or low work; it uses a corrugated-top cap 22 inches above ground, or a 10-inch-square toe lift which is 4 3/4 inches above ground. The entire elevating mechanism is at the top of the jack for better ground clearance. The ratchet is dustproof, and steel alloys are used in the working parts.

You can secure all details about the Simplex 2522 by writing Templeton, Kenly & Co., 1020 So. Central Ave., Chicago 44, Ill. Mention this news report.

### Slip-Over Tip Aids In Torch Soldering

The standard oxyacetylene welding torch can be adapted for body soldering, tinning, and light brazing with a new device which it has developed, the Acet-A-Tip Co. has announced. This device is attached to the tip of the welding torch by means of a base fitted with a 2-inch length of heavy-duty 2-ply hose. The hose is forced over the torch tip.

To use Acet-A-Tips, the acetylene pressure is set at about 5 pounds, and the flame adjusted by the torch valve. Oxygen is not used with these tips. Machined from solid brass-bar stock, they are available in three sizes.

Further details about this new attachment can be obtained by writing the Acet-A-Tip Co., 5069 W. Madison St., Chicago 44, Ill., and mentioning this news report.

### I-H Branch Staff Shifts

Branch management changes announced recently by the Motor Truck Division of International Harvester Co. affect six outlets in the firm's nationwide network.

D. F. Kuntz, Assistant Manager at Toledo, will now serve in the same capacity at Minneapolis. Retail Truck Sales Manager W. H. Brisendine, Nashville, Tenn., has been appointed Assistant Manager of that branch.

The former Sales Promotion Manager at Charlotte, N. C., R. B. Livesay, is now Assistant Manager at Birmingham. W. O. Bolitho has relinquished the post of Assistant Manager at Billings, Mont., to become a special traveler for the company's refrigeration division in the northwest.

### Book on Instruments For Physical Measure

Users of scientific instruments for making physical measurements will be interested in a study contributed to by British specialists and organizations. It is published in this country by the Chemical Publishing Co. The book covers not only the instruments used in the laboratory, but also those used in the field, in industry, and in commerce. It describes them with text, pictures, and diagrams. It discusses the principles on which they are based and methods of measurement.

Contractors and engineers will be especially interested in sections of "Scientific Instruments" devoted to surveying devices, optical systems, liquid testing, and instruments which measure density, dimension, pressure, weight, hardness, etc.

Copies of "Scientific Instruments" can be obtained from the publisher at 26 Court St., Brooklyn 2, N. Y. The book is priced at \$6. Its editor is Herbert J. Cooper, Head of the Engineering Department at the South-West Essex Technical College.

bert J. Cooper, Head of the Engineering Department at the South-West Essex Technical College.

### Lincoln "Ups" Taylor

C. M. Taylor has been named Executive Vice President of The Lincoln Electric Co., Cleveland, Ohio. He has been with the firm since 1916, and has guided its sales since 1928.

### Lifting-Magnet Chargers

Chargers for electric lifting magnets are built in a number of capacities by The Ready-Power Co. of Detroit. The units have an International Harvester gasoline engine driving a Ready-Power dc generator. A full description of these chargers is given in Bulletin 102. You can obtain it from The Ready-Power Co., 76 W. Adams St., Detroit 26, Mich.



MURPHY DIESEL COMPANY, 5319 W. Burnham St., Milwaukee 14, Wis.

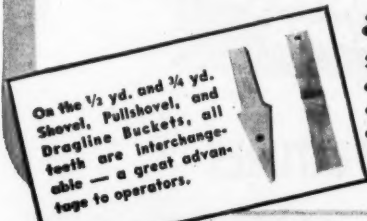


America's Most Complete Line of Material Handling Buckets

All purpose-

- SHOVEL
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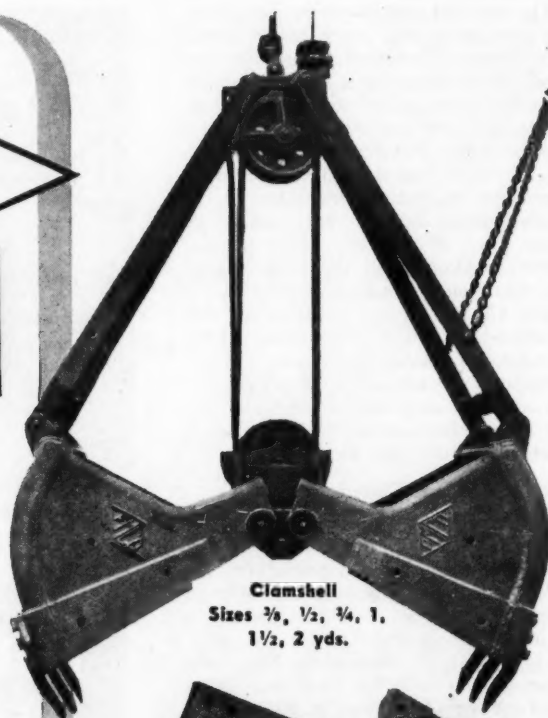
• FRONTS, BOTTOMS, SCOOPS and TEETH are 14% manganese steel developing tensile strength up to 120,000 p. s. i. This high percentage manganese steel gives tough, rugged strength for hard service and allows wide set corner teeth for easy entrance in digging. Volume production methods enable us to build a better bucket with amazing economies in manufacturing.



On the 1/2 yd. and 3/4 yd. Shovel, Pullshovel, and Dragline Buckets, all teeth are interchangeable — a great advantage to operators.

### Experience Counts

See your shovel man or equipment dealer about PMCO Buckets and Dippers.



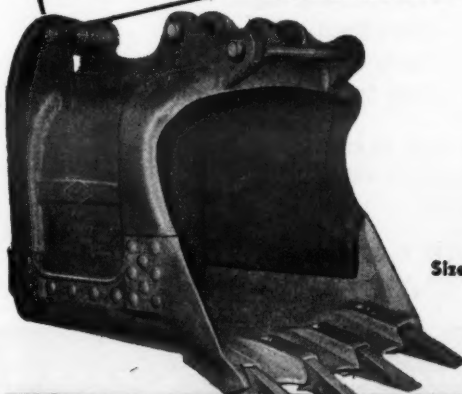
Clamshell  
Sizes 3/8, 1/2, 3/4, 1, 1 1/2, 2 yds.



Pullshovel  
Sizes 3/8, 1/2 and 3/4 yd.



Dragline  
All purpose sizes 3/8 to 2 1/2 yds.  
Heavy duty sizes 2 to 3 1/2 yds.  
Stripping sizes 4 to 9 yds.



Shovel  
Sizes 3/8 to 18 yds.

"Quality Since 1880"  
**PETTIBONE MULLIKEN CORP.**

CHICAGO 51,  
U. S. A.

WE OPERATE THE LARGEST AND MOST COMPLETE MANGANESE STEEL FOUNDRY IN THE UNITED STATES.



## Safety Programs Save Lives, Money

**Construction-Section Meeting  
At National Safety Congress  
Considers Ways and Means  
To Increase Safety**

† ALTHOUGH a construction worker's job today is 80 per cent safer than it was twenty years ago, there still is great room for improvement. Edgar N. Goldstine, Consulting Safety Engineer of San Francisco, reminded his audience of this at the Construction Section of the National Safety Council during its thirty-fourth meeting held in Chicago from October 7 through 11.

"Accidents will remain at a high level in the construction industry because on nine out of every ten jobs there are no accident-prevention programs," Mr. Goldstine declared.

The marked improvement noted during the last twenty years in job safety is a result of intensified national and local safety programs, and the adoption by many contractors of regular safety campaigns and approved safety measures on their contracts, the speaker said. As a result, lost-time accidents have decreased from 120 per million man-hours worked twenty years ago, to 20 today.

The speaker listed the following as important elements in any safety program: (1) instruction and training; (2) accident-prevention inspections; (3) investigation of serious accidents; (4) installation of mechanical safeguards; (5) accident and hazard analysis; (6) use of accident data; and (7) use of safety literature and pictures.

### Panel Discussion

Investigations of job accidents should elicit the cause of the accident. They should result in recommendations for elimination of the cause and action to be taken. And they should fix the direct or indirect responsibility for the accident. So Otto S. Holmskog, Sr., Construction Engineer for Employers Mutual Liability Insurance Co., Milwaukee, declared. Graphic illustration of these points was presented in the form of a panel discussion, which reported on investigations of three actual construction

accidents. Participating in the discussion were Mr. Holmskog; Joseph DeLuca, Safety Superintendent, Construction Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; John Dahlman, Vice President, Dahlman Construction Co., Milwaukee; Art Schallock, Construction Superintendent, Klug & Smith Engineering Co., Milwaukee; and Helen Reischel, Industrial Nurse, Employers Mutual Liability Insurance Co., Milwaukee.

The first investigation reported the collapse of a concrete slab under construction, which resulted in one death and two serious injuries. It fixed responsibility on poor relations between the engineer and foreman on the job. The second investigation reported the collapse of a scaffold which plunged a mason 60 feet to his death. Seventy-five per cent of the responsibility for this accident lay with the workman who had not fastened his safety belt; 25 per cent was charged to administration and supervision on the job for failure to impress safety requirements on the

workman. The final investigation was of an accident which resulted in amputation of a signal man's legs when the boom of a crane collapsed under load. Three-fourths of the responsibility here was charged to the operator of the crane, whose personal problems had impaired his state of mind; one-fourth devolved on supervision, for failure to make regular and thorough inspections of equipment.

"Too often investigations of accidents are simply whitewashes of the persons involved," said Mr. DeLuca. "Honest investigations which seek the truth show that people are more often at fault than are materials or equipment. We need fortitude in presenting the real accident facts, and we must have these facts if we are going to make progress in accident prevention."

### Accidents With Equipment

Many of the accidents involving heavy equipment are a direct result of operator fatigue, said R. A. Beckwith, Vice President and Chief Engineer of



the Koehring Co., Milwaukee.

"I know of many serious accidents," said Mr. Beckwith, "where fatigue has played an important role, especially in the operation of equipment where alertness and close coordination of mind and body are all-important. A man's judgment is never keen when he is suffering

(Concluded on next page)



SHOVEL . . .



TRENCH HOE



DRAGLINE



WHEEL MOUNTS

**DOLLAR  
for DOLLAR**  
of First Cost and Operating Cost  
**THE  
3/4-SWING BADGER**  
MOVES MORE MATERIAL . . .  
FASTER AND CHEAPER

### Check these BADGER FEATURES

- ✓ Lighter Swinging Weight
- ✓ Greater Stability
- ✓ Better Visibility
- ✓ No Tail Swing
- ✓ Extra Dumping Height
- ✓ Extra Reach
- ✓ Easily Portable
- ✓ Fully Convertible

AND ASK YOUR NEARBY A-W DEALER to tell you the whole story of how the versatile BADGER will save time and make money for you.

**AUSTIN-WESTERN COMPANY**  
AURORA, ILLINOIS, U. S. A.

**Shunk** Snow  
and Ice Removal  
**BLADES**

Proved record of superior performance. Made of specially developed steel to withstand severe service conditions. FOR ALL TYPES AND MODELS OF SNOW PLOWS. Various widths, lengths, thicknesses—flat or curved—standard or special—punched ready to fit your machine. SHUNK SAW-TOOTH ICE BLADE. Amazingly effective. Thoroughly breaks up and removes heavy, slippery ice and snow formations. Replaces all types of snow plow blades or maintenance units. Write for Bulletin and name of nearest Distributor.



**Shunk**  
MANUFACTURING  
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ESTABLISHED 1854  
BUCYRUS, OHIO.

BUILDERS OF ROAD MACHINERY  
**Austin Western**  
SINCE 1859



## Safety Meeting

(Continued from preceding page)

from physical fatigue."

As evidence for his statement, the speaker cited reports showing that most accidents happen near the end of the day. He pointed out that manufacturers are contributing to the reduction of fatigue by making equipment easier to handle and operate.

### Safety Saves Money

Safety is not an intangible. It can be measured in dollars and cents, declared Lt. General R. A. Wheeler, Chief of Engineers, Corps of Engineers, U. S. Army, Washington, D. C. A recent audit of wartime expenditures revealed a saving to the Government of \$10,296,886 on only 182 construction projects. This figure represents savings in premiums on workmen's compensation insurance.

"You can make your own guess as to what the total savings will be when all of the jobs have been audited," General Wheeler said.

Safety is good, sound, business economy, the speaker continued. The U. S. Engineers intend to stress safety on their many construction projects, including the long-range flood-control program and the \$750,000,000 worth of construction which they are undertaking for other Federal departments.

"A full measure of accident prevention will be applied in all activities," General Wheeler said.

### Reducing Hazards

Construction is a hazardous occupation, but it can be made less dangerous by practicing job safety, said John Dahlman, Vice President of the Dahlman Construction Co., Milwaukee. Conservation of limited, skilled manpower is one of the primary reasons every contractor should give serious attention to safety, he said.

"Safety is distinctly a problem for the employer," continued Mr. Dahlman. "It is his responsibility to teach the workers to think safety and to work safely."

A suggested safety-training program outlined by John F. Sembower, former Training and Relations Supervisor, E. I. du Pont de Nemours & Co., Inc., Chicago, included these points: (1) plan the training; (2) start it early; (3) make it facile, quick, and practical; (4) follow up the training and constantly evaluate its effectiveness; and (5) relate safety and training in everything on the job.

"Training," said Mr. Sembower, "will help achieve safety. And well trained workers are not only safe workers; they also expedite construction."

### Officers Re-Elected

The Construction Section of the National Safety Council re-elected all officers. These include: General Chairman, Lloyd A. Blanchard, Corps of

Engineers, U. S. Army, Washington, D. C.; Vice Chairman, Frank J. Crandell, Liberty Mutual Insurance Co., Boston; Secretary, Harry J. Kirk, Associated General Contractors of America, Inc., Washington, D. C. The Program Chairman, also re-elected, was Otto S. Holmskog.

### Magnetic Attachment Guides Flame Cutting

Ragged edges can be avoided when cutting steel plates with a hand torch, the Universal Power Corp. says in announcing its new cutting guide, a straight-edge with magnetic holders. The guide is designed for use in any position and on any surface.

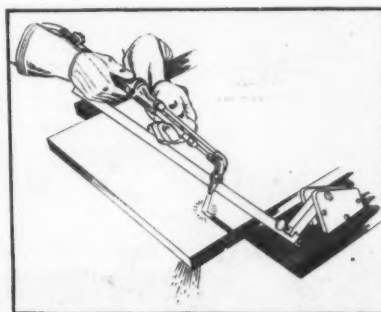
Known as the Cut-O-Guide, the device comprises two magnets which attach a heat-resistant aluminum-alloy straight-edge to the work surface. The magnets have a 30-pound pull and can be located as desired along the straight-edge. A guide collar that fits over the

torch tip rides along the edge during operations. The straight-edge can be adjusted for right-angle cuts or 30-degree scarfing bevels. It is furnished in a standard length of 3 feet, and up to 10 feet on special order. The same magnetic clamps can also be used to hold templates for contour cutting.

Full details about this handy accessory can be secured from the Universal Power Corp., 725 Carnegie Ave., Cleveland 15, Ohio. Tell the firm you saw this new-product report.

### Heavy-Duty Power Units

A heavy-duty power plant in the 13 to 22-hp range is described in a bulletin on the Wisconsin Model VE-4. The air-cooled gasoline engine is supplied in various mountings, with clutch assembly, as a complete power unit, and with a side-mount gas tank. Details are given in Form VE-4-45-9, which the company will send you on mention of this notice. Write Wisconsin Motor Corp., 1910 So. 53rd St., Milwaukee 14, Wis.



On the new Cut-O-Guide made by Universal Power Corp., magnetic holders keep the straight-edge in place to guide flame cutting of steel sheets.

### Tractor Man Heads SAE

C. E. Frudden, Consulting Engineer in the Tractor Division of Allis-Chalmers Mfg. Co., is to head the Society of Automotive Engineers during 1947. L. R. Buckendale of Timken-Detroit-Axle Co., is the retiring President of the Society.

# KOEHRING 605

## WORTH MORE IN LIFTING CAPACITY ALONE

**At a 12' radius, lifts better than 60,700 honest pounds, (75% rating) based on built-in stability and strength, not heavy counterweight.**

### Plus these Extra Values

- Power Clutch Retains "Feel"** — A 10# pull sets big 37" clutches. Heavy hand pull is eliminated. Operator definitely gets "feel" of load, retains accurate control. When lifts call for exceptional accuracy, inserting one set-screw quickly changes to manual clutch.
- Independent Live Boom, Power Lowering Available** — Changing boom reach is safe and easy with 605 independent boom hoist... raise or lower while you travel or swing. Power lowering for extra smooth boom control also available.
- High A-Frame Raised and Lowered by Power** — Cut time for clearing under overhead obstructions. Remove two pins, lower and raise by power... boom suspension cables stay in place.

# 30 1/2 TONS

**Exceptional Cable Economy** — Main drum clutch cannot jerk, cannot shock load cable. Boom-hoist drum with extra spooling width cuts cable wear common with long booms. Hoist cable spools over top of large drum... better boom clearance, hugs drum closer.

**Jib boom extension, shown above, is also available. Second drum permits reeving two hoist lines, using either, one on main boom or one on jib, depending on load and lift desired.**

## KOEHRING COMPANY

MILWAUKEE 10, WISCONSIN

*Subsidiaries*

JOHNSON • KWIK-MIX • PARSONS

## HEAVY-DUTY CONSTRUCTION EQUIPMENT

## WON'T QUIT or cause time out

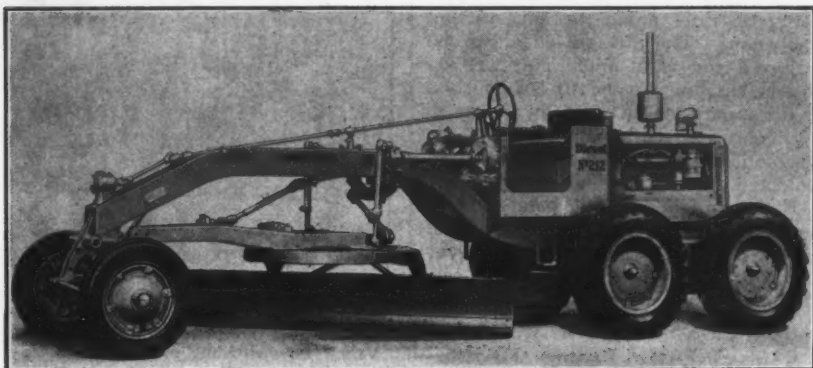


A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

The Hayward Company  
32-36 Dey Street  
New York, N.Y.

## Hayward Buckets





The Caterpillar No. 212 diesel motor grader, smallest of the Series 12 graders, is once more in production.

### Diesel Motor Grader Again in Production

Smallest of three sizes in the Series 12 motor graders, the diesel Model 212 has been put into production again by the Caterpillar Tractor Co. Its production was suspended during the war.

A rear-mounted 35-brake-hp Caterpillar 4-cylinder 4-cycle diesel engine powers the 212. The grader is built with both tandem and single drives and is normally equipped with a 10-foot moldboard and leaning front wheels. Its traction, strength, and blade positions are designed for a complete range of blade work. Positive-acting precision-made mechanical control provides fast easy operation of blade and scarifier, the manufacturer states.

You can secure full specifications for the 212 motor grader by writing the Caterpillar Tractor Co., Peoria 8, Ill., and asking for Form 1823. Mention this notice.

### New Consulting Engineer

Colonel Roy D. Burdick has announced his retirement from active service with the Corps of Engineers, U. S. Army, and his availability as a consulting engineer. With headquarters at 512 Exchange Bldg., Little Rock, Ark., Col. Burdick will engage in water-control projects, stream-drainage reports, and general civil-engineering practice.

### All-Welded Clamshells

The advantages claimed for all-welded construction in clamshell buckets are analyzed in an 8-page bulletin just issued by the C. S. Johnson Co., a

Koehring subsidiary. Complete specifications for all three types of Johnson welded buckets are given. The firm makes general-purpose, wide-rehandling, and heavy-duty digging buckets in sizes from  $\frac{3}{8}$  to  $2\frac{1}{2}$  yards.

Copies of Form J-233 can be secured by addressing the firm at Champaign, Ill., and mentioning this notice.

### Standard Knockdown Gravel-Plant Units

Designed to provide economical operation at a sizable construction or paving job and for removal to new locations several times a year, a new sand and gravel plant has been announced by Link-Belt. It features special screening and dewatering equipment and standardized units for easy dismantling, moving, and reassembling.

A standard Link-Belt scrubber, two double-deck vibrating screens, one feed conveyor, four stockpile conveyors, a crushed-gravel return belt, a dewatering screw conveyor, and a crusher for oversize aggregate are the principal units in the plant. Power is supplied by an electric motor or a gasoline engine.

All units of the structure are sectional to provide for easy dismantling: belt conveyors in 20-foot sections, the scrubber, the trunnion, the frame, and the drive. The main frame, 28 x 8 x 8 feet, is moved intact on a trailer.

Full details about the new sand and gravel plant can be obtained from the Link-Belt Co., 307 No. Michigan Ave., Chicago 1, Ill. Mention this news report in CONTRACTORS AND ENGINEERS MONTHLY.

### Rust-Prevention Data

Rust, the bugaboo of everyone who uses metal machinery and tools, is discussed in a 36-page booklet which the Texas Co. offers to send to readers of CONTRACTORS AND ENGINEERS MONTHLY.

How to prevent rust is outlined in the booklet, which features the Texaco rustproof compound, a waterproof film. When brushed onto a machine, it is said to prevent the formation of rust, to penetrate existing rust, stopping further corrosion, and to loosen it for easy removal.

Contractors and highway-department officials can secure their copies of this handy booklet by writing the Texas Co., 135 E. 42nd St., New York 17, N. Y. Tell the firm you saw this notice.

**AT HOME on snow and ice**

**The Polar Bear**

The Polar Bear does a fine job of living and traveling amid Northern snows and ice. To help him, Mother Nature thoughtfully equipped him with unusually flexible muscles that control his huge paws. This gives him the sure-footed traction to hunt his quarry in the snow and on the unstable, slippery ice floes.

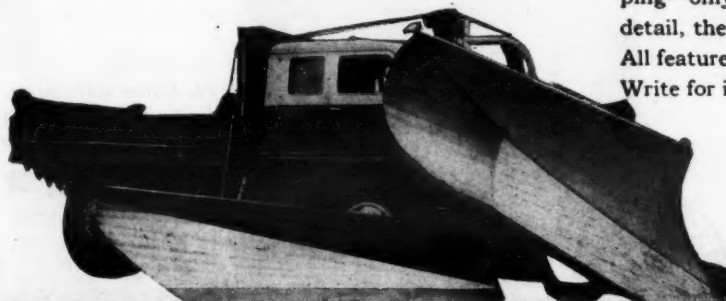
## WALTER SNOW FIGHTERS

WALTER SNOW FIGHTERS, too, are right at home on snow and ice... because they have been especially designed for that job. The unusual flexibility of the Walter Four Point Positive Drive provides maximum traction on ice and snow.

This sure-footed traction enables Walter Snow Fighters to propel 28' plows through snow at 20-30 m.p.h. This speed gives maximum snow dispersion, reduces re-handling and permits faster clearing. Thus, highways are finished quicker and secondary roads opened before snow can

form hard-packed ruts and freeze. It is traction, too, that enables Walter Snow Fighters to blast through huge drifts that stop other trucks.

This traction is derived from three automatic locking differentials—the heart of the Walter Four Point Positive Drive. They proportion engine power to the FOUR driving wheels according to the traction of each wheel at any instant. Even if one, two or three wheels slip, power is concentrated on the fourth to keep the truck moving until full traction is regained. No wheel-spinning, no bogging-down, no side-slipping—only a steady driving ahead. To the finest detail, the Walter is every inch a Snow Fighter. All features are described in illustrated literature. Write for it.



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**CONTINENTAL**  
**RUBBER WORKS**  
PITTSBURGH, PENNSYLVANIA, U.S.A.



## Big Rock Breakwater To Halt Harbor Silting

(Continued from page 2)

seaward side, and 3 feet 3 inches thick on the inward slope. Cap rock was 4 feet thick. Specifications for face rock called for a well graded, durable rock ranging from  $\frac{3}{4}$  cubic foot (100 pounds) to 40 cubic feet (3 tons). Cap rock was from 3 to 8 tons per piece.

All face and cap rock was placed by two Northwest 95 barge-mounted cranes, using four-part rock grapples on a 60-foot boom. The machines, spotted on location by anchors, unloaded the heavy rock from open-deck barges lashed alongside the crane mount.

It is a little difficult to explain how crane operators Jim Croon and Fred Leake placed the face rock so perfectly. It is always difficult to talk of perfect workmanship when the reason behind it is not an engineering formula or an inspector's demand. The secret of the Alameda breakwater job of interlocking face rock, which was as smooth as if Paul Bunyan had hand-placed it, was sheer experience, the experience of master craftsmen. Both men had placed a great deal of the heavy rock around San Francisco Bay, and they knew how to handle what they were up against.

How could the operators place heavy rock, with machinery, underneath the water line, out of sight, so it would interlock? It is anybody's guess. But according to Mr. Christensen, who went out on a minus-1-foot low tide one memorable day to find something wrong, it was perfect that far down, for he saw it all. Not one flaw in placing did he find.

Basalt Rock Co. used preformed plow-steel cable to combat wear and bending fatigue on crane rigging, especially in the grapple closing and holding lines. Preformed wire rope was also used in the electrically operated hatch-hoist rigging. Aside from its longer wearing qualities, preformed rope was easier to install when the old lines finally wore out.

All face, cap, and core rock was paid for by the ton, and quantities placed were checked by measuring the displacement of loaded barges. Thanks to Christensen's circular survey charts, the spillage of rock outside contract limits was negligible. With shifting currents, 6-foot seas when there was a strong southeast wind, and riptides, that is something of an accomplishment.

Rough weather during the winter months of 1945-46 hampered the work and harassed supervisors who tried to make their labor and plant-rental charges productive. Rough weather, however, did not slow the job down as much as it would have if a conveyor-barge system had not been used.

In time, mud and silt from the Sacramento River will sift down through the estuary and cover up the trench that was dredged on the seaward slope for facing rock. With only a narrow entrance channel on the south side for small boats and seaplanes to enter the inner harbor behind the new breakwater, Navy engineers now believe the silting problem there is stopped. Another improvement in the inner harbor will be a reduction in secondary swells, which in the past caused aircraft carriers and tenders moored to docks to rub dangerously.

### The Rock Quarry

Quarries were worked at Napa, and at McNear location. The McNear quarry



C. & E. M. Photo

Two Northwest 95 cranes unloaded and placed heavy facing and cap rock for the breakwater. The barges on which they were mounted were anchored on location and the open-deck carrier barges lashed to them.

turned out most of the core rock, and was set up on a high-production limit of 500 tons an hour. Rock, broken out of the quarry, was passed over a grizzly

and through a large jaw crusher set at wide clearance. All rock passing through the grizzly was routed over a  
(Concluded on next page)

**the job . . .** Putting down slurry base material at average of 1027.64 tons per day



High speed, high production paving with an Adnun Black Top Paver sacrifices nothing in getting quality surfaces, tight joints and uniform compaction. Whether the job calls for laying ten tons a day or a thousand—Adnun-laid roads are better roads!

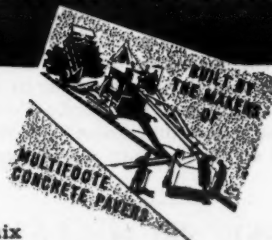
**the equipment . . .** This ADNUN BLACK TOP PAVER

**O**n schedules like this, Adnun Black Top Pavers show what real paver performance can be . . . Where volume and quality paving both count, and where dependable paver operation paces the whole job. Clement & Company, Hayward, California, own the Adnun shown at work above, and have had daily runs as high as 1,400 tons of plant mix slurry base material in setting their record 1,027.64 tons per day average.\*

And only Adnuns have the versatility to handle all these paving jobs: Any black top mix, hot or cold, heavy or light . . . Crushed rock . . . Soil cement . . . Aggregate . . . Sand or gravel. Adnun's exclusive construction advantages not only let you pave with a full range of materials, but also give you paving quality that means longer life for roads and airports at lower original cost. The new Adnun Catalog contains full details . . . Ask for your copy today.

THE FOOTE COMPANY, INC., 1916 State Street, Munda, New York

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TRADE MARK REGISTERED  
**BLACK TOP PAVER**



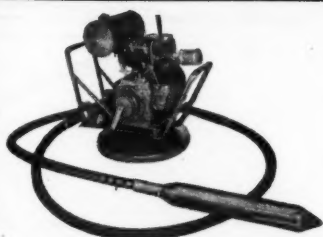
### \*A CHALLENGE

"Bob" Coats, of Clement & Co., writes: "Here is the schedule so far, and I doubt if anybody has beat it:"

Date	Tons per day Slurry Base
5-31-46	672.48
6-1-46	460.00
6-3-46	1,025.71
6-5-46	791.23
6-6-46	1,031.21
6-7-46	1,164.24
6-8-46	1,351.92
6-10-46	1,328.45
6-11-46	760.06
6-12-46	1,141.26
6-13-46	1,225.14
6-14-46	1,400.00
Total 12,351.70	

Or a Daily Average of 1,027.64 Tons.

Can YOU beat it? If so, we'd like to hear details on your job.



### Concrete VIBRATORS

Gasoline Engine or  
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### CONCRETE GRINDERS

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for Industrial Tractors

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for Asphalt and Tar

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for Stone and Sand

### ASPHALT PLANTS

Portable—Stationary

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**White Mfg. Co.**

ELKHART

INDIANA



## Big Rock Breakwater To Halt Harbor Silting

(Continued from preceding page)

conveyor belt to the quarry dock. Barges tied in at the dock received their loads direct from this conveyor without further handling, and were rushed by tug to the job.

As was the case in placing cap and face rock, the quarrying and loading was also slower and more complicated. Each stone had to be picked up, loaded on a truck, and then rehandled by crane to the barge.

### Personnel

Captain W. W. Schneider (CEC) USN was the Public Works Officer for the 12th Naval District with headquarters in San Francisco, and was in charge of the work. Mr. Christensen was assisted by Hans V. Jensen and Logan Elliott. Mr. Christensen is now rounding out 30 years of service with the Navy, and expects soon to retire.

Harold Benton was Superintendent for Basalt Rock Co., Inc., assisted by Lyle E. Anderson, Breakwater Engineer. Anderson was formerly in the Seabees, and took the job of engineering upon his discharge.

Civil Engineer Corps officers of the Navy who acted as Resident Officers-in-Charge included Lt. Commander C. G. DeSwarte, Lt. Commander M. S. Lustbader, and Ensign Gilbert P. Edwards. Chief Warrant Officer Don L. Ross, who ramrodded the job for the Navy during its early days, is now supervising construction of Rector Creek Dam near Napa. (See C. & E. M., Sept., 1946, pg. 55.)

## Mechanical Expansion Used to Break Rocks

Breaking oversize rocks or concrete is easy and safe with the Maloney Concrete and Rock Buster, the Universal Pneumatic Tool Co. says in a bulletin for the contracting and highway-maintenance fields. The Buster splits the rocks by mechanical expansion.

Made of specially treated steel, the Buster comprises sections that operate on movable slides on a central shaft. These sections expand in parallel lines along the bore of the hole drilled in rock, causing the rock to break up into smaller pieces. The unit can be driven down with an air hammer or with a sledge. The direction of breakage can be controlled, Universal says.

The Maloney Rock Buster is made in four sizes, 1 1/4, 1 1/2, 1 3/4, and 2 inches. Drill-steel shanks are supplied in the following sizes: 7/8 x 3 3/4 inches, 1 x 4 1/4, 1 1/8 x 6, and 1 1/2 x 6.

You can secure further details about this new rock-breaking device by writing the Universal Pneumatic Tool Co. and mentioning this notice. The firm is located at 722 Chestnut St., St. Louis 1, Mo.

## Quickly Set Holder Speeds Pipe Threader

A quickly set work holder and balanced loop handles are innovations on a new geared pipe threader announced by the Ridge Tool Co., 400 Clark St., Elyria, Ohio. With the new holder, the threader can be set exactly for pipe size and only one screw need be tightened to hold it securely on the pipe, Ridge says.

The loop handles, set on the enclosed gear case, prevent slipping or tipping over, and make it easy to pick up the threader and put it straight on the pipe, the firm explains. It also allows the worker to carry the machine in one hand. A twin-anchored drive shaft that

turns in oilless bronze bearings is said to give economy of operation.

Known as the 4P, the threader is provided with four sets of five high-speed cutting dies. Each tool has a ratchet handle, and a special universal drive shaft is available for power.

Write the Ridge Tool Co., for further details about this new pipe tool, and tell the firm you saw this news item.

### Radial-Arm Saws Shown

Speed, safety, and economy are operating features of its Multiplex radial-arm saws and drill press, Red Star Products, Inc., says in a recent brochure. The new circular features the versatile-elbow design of the Multiplex 360-degree pivoting track. It lists specifications for Models 30A and 40A saws, and the Model 10,000 drill press.

You can secure your copy of Form 10 for further study by writing the Red Star Products, Inc., 3455 Vega Ave., Cleveland 13, Ohio. Mention this notice.



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"Safety first"  
at Low Cost—  
TUTHILL  
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CURVES, embankments, bridge approaches, grade crossings—all are made safe with the TUTHILL Guard. It combines high visibility, flexibility plus strength, low-cost installation, and economy of maintenance. Available for maintenance or installation. Request details.

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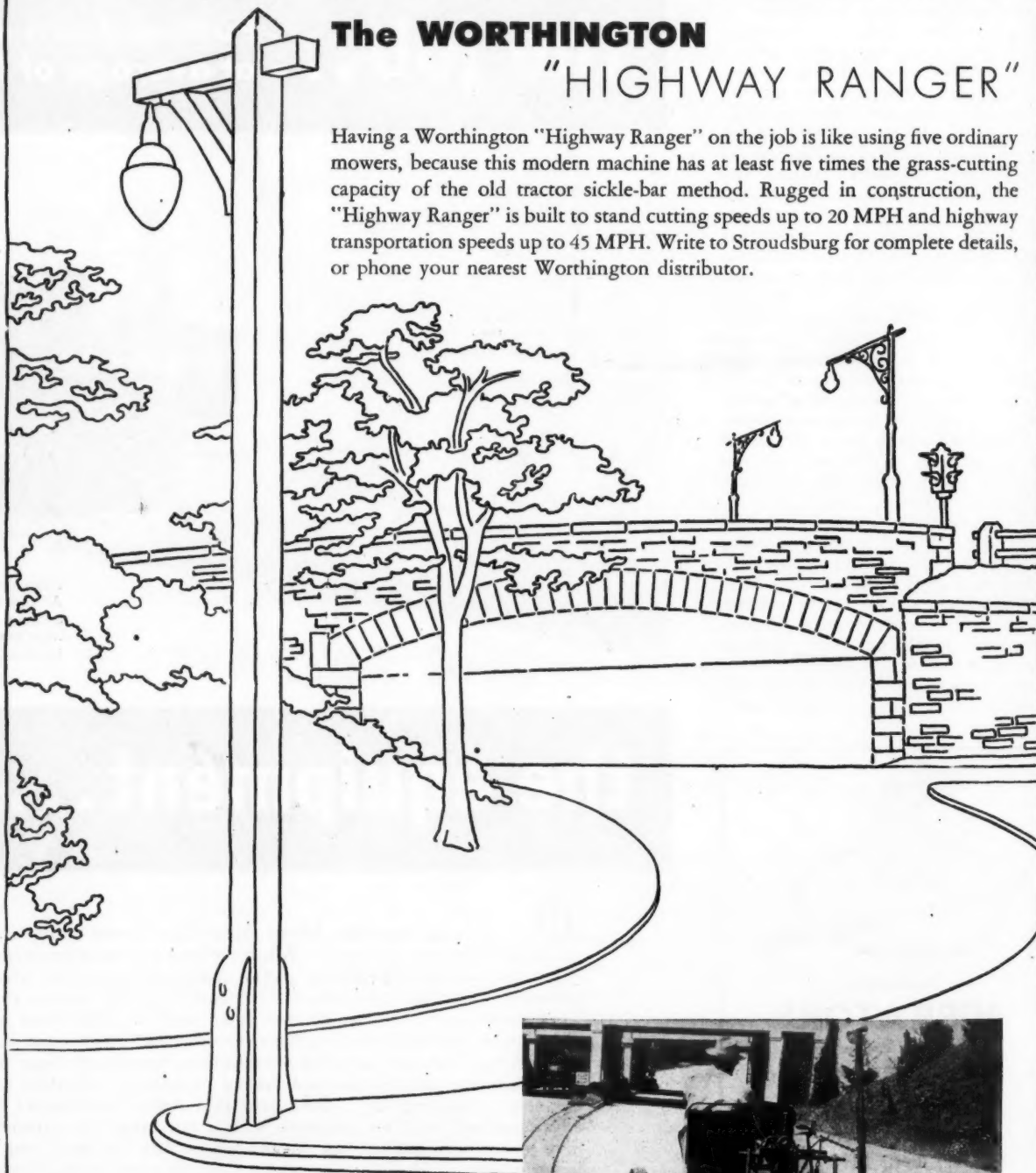


## The country's leading highway departments specify

### The WORTHINGTON

### "HIGHWAY RANGER"

Having a Worthington "Highway Ranger" on the job is like using five ordinary mowers, because this modern machine has at least five times the grass-cutting capacity of the old tractor sickle-bar method. Rugged in construction, the "Highway Ranger" is built to stand cutting speeds up to 20 MPH and highway transportation speeds up to 45 MPH. Write to Stroudsburg for complete details, or phone your nearest Worthington distributor.

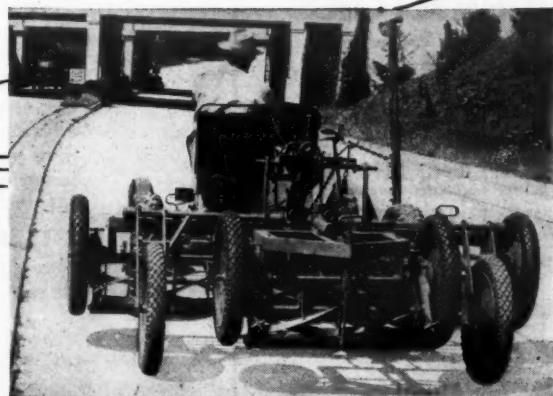


### WORTHINGTON MOWER COMPANY

STROUDSBURG, PENNSYLVANIA

Established in 1914

Division of Jacobsen Manufacturing Company



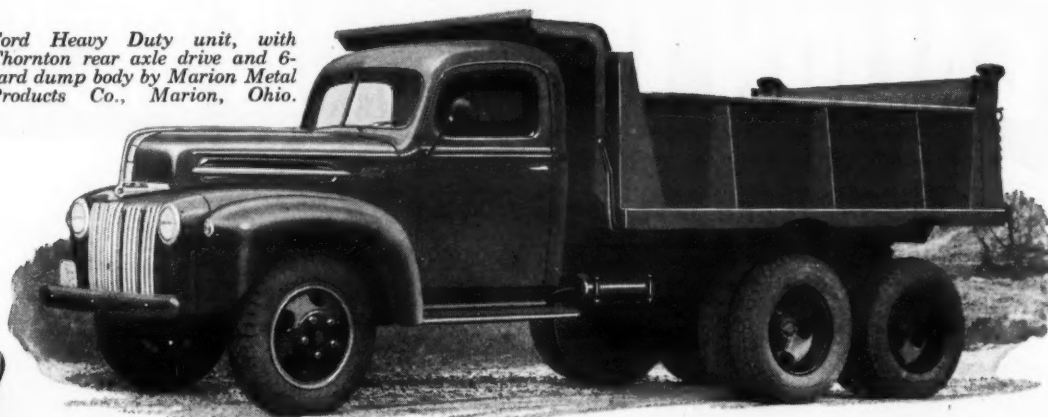


REGISTRATIONS SHOW IT—OPERATORS KNOW IT!

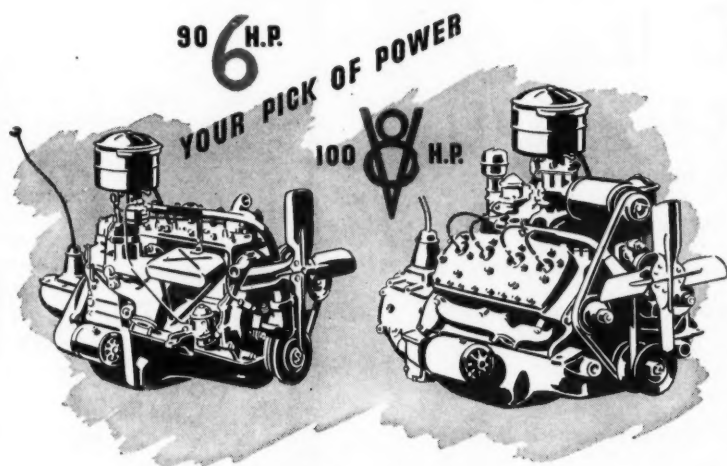
# "FORD TRUCKS LAST LONGER!"



*Ford Heavy Duty unit, with Thornton rear axle drive and 6-yard dump body by Marion Metal Products Co., Marion, Ohio.*



**One big reason—  
FORD ENGINES STAND UP!**



Ford Truck engines—either the famous 100-H.P. V-8 or the extra-thrifty 90-H.P. Six—are world-famous for endurance in severe service. Here are some reasons why: They're of time-proved L-head type, quiet, simple, efficient—hardened valve seat inserts resist pounding and pitting—precision-set valves need no adjusting—valve springs are shot-peened and rust-proofed for long life—Ford alloy cast steel crankshafts are balanced and counterbalanced for enduring smoothness—Flightlight aluminum alloy 4-ring pistons maintain good compression, save oil. Full pressure lubrication, with positive, large-capacity oil pumps, plus effective crankcase ventilation, scientifically correct cooling and efficient oil- and air-filtering, all prolong Ford engine life.

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Trucks registered since 1928 are still in service—why more than half of all Ford Trucks on the job are at least nine years old!

The best way to get a new Ford Truck is to get your order in. See your Ford Dealer now.

## ***FORD TRUCKS***

**MORE FORD TRUCKS IN USE TODAY THAN ANY OTHER MAKE**



## Hydraulic Governor Has New Principle

A new principle is used in a hydraulic governor for gasoline and diesel engines that has been put into production by the Milwaukee Lock & Mfg. Co. Hydraulic and centrifugal forces are combined in the new unit for effective engine control, maximum sensitivity, and efficiency without loss of power, the firm says.

Made in four types—automotive, constant speed, overspeed shut-off, and universal—the governor is available in all standard sizes. Another feature of the unit is its flexibility of power take-off in relation to governor control. The power source for driving the pressure generator can be located as far as 30 feet from the governor control without

loss of operating efficiency, Milwaukee states.

If you are interested in this type of governor for your gasoline or diesel engine, drop a line to the Milwaukee Lock & Mfg. Co., 730 W. Virginia St., Milwaukee 4, Wis. Tell the firm you saw this report.

## New Electrode Does Variety of Shop Work

For general welding or work involving poor fit-up the Air Reduction Sales Co. has added a new all-position electrode to the Airco line. The No. 87 is a general-purpose mild-steel rod. It is especially recommended for low-cost single or multiple-pass welding on plates where the fit-up is poor, or the

work is rusty or dirty. It has an extruded coating and is said to work well on dc straight or reverse polarity, and on ac. The rod conforms to AWS Classification E-6012 and is marked in accordance with NEMA standards.

Further information on this newly developed electrode can be secured from the Air Reduction Sales Co. on mention of this news item. Write the firm at 60 E. 42nd St., New York 17, N. Y.

## Line of Sinker Drills

Six models of sinker drills, for heavy-duty and medium drilling in many types of work, are featured in a 12-page catalog issued by the Cleveland Rock Drill Division of The Cleveland Pneumatic Tool Co. These hand-held air-driven

tools range from 32 to 83 pounds in weight.

You can obtain the catalog by mentioning this notice when writing to the Division at 3781 E. 77th St., Cleveland 5, Ohio.

## 10 Extra Men for Your Maintenance Crew



No. 610 Util-A-Tool. 10-ton capacity. Pushes apart or pulls in 4 3/4" each grip.

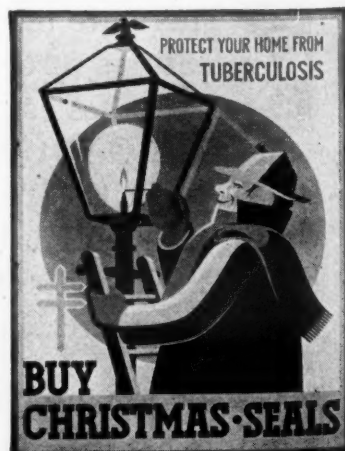
The complete Simplex Util-A-Tool set costs less than a week's pay, yet it does the work of ten men and saves tremendous numbers of man-hours on numerous maintenance and construction jobs. Its nine easy-to-use parts can be arranged to push, pull, tie forms, bind loads, clamp and hold parts for welding, bend beams and pipe, straighten bent structural members, etc. Pulls stubborn gears, wheels and frozen members. Can be used as a conventional jack or as a press. Ask for Bulletin P&P-45.

Templeton, Kenly & Co.  
Chicago 44, Ill.

Accessories supplied with Util-A-Tool.



**SIMPLEX**  
WORLD'S MOST COMPLETE LINE OF  
**JACKS**  
LEVER SCREW HYDRAULIC



13,550 lbs.  
**BLADE PRESSURE!**  
That's more than enough to easily handle your toughest road construction job.

**\*23,900 lbs. of ENGINEERED Weight!**

\*Total Weight with Scarifier

But weight is not put on the New Galion 102 Grader just for the sake of weight—every pound on the 102 serves an important purpose—and this weight is so engineered into the design that fully 65-70% of it is placed over the rear wheels where it adds greatly to the effectiveness of Galion's famed tractive power.

This proper distribution of weight means that it is not necessary to add calcium chloride or other dead weights in the rear tires to secure sufficient tractive power. The Galion 102 really "keeps its wheels on the ground," its blade biting in, and moves relentlessly forward until the job is finished.

## YOUR GALION DISTRIBUTOR WILL DEMONSTRATE IT FOR YOU

You owe it to yourself to contact the nearest Galion Distributor and arrange for a demonstration. Get up in the operator's seat, try it yourself—and you'll never be satisfied until you own a Galion 102. Catalog No. 290 describes in detail the many advanced operating features of the Galion 102—write for a copy today.

The **GALION IRON WORKS & MFG. COMPANY**  
General and Export Sales Offices  
Galion, Ohio, U.S.A.

**GALION**  
**IRON WORKS**  
**GRADERS • ROLLERS**



# Work Starts at Site Of Flood-Control Dam

## Black-Top Access Road Built; 125 Acres Cleared For Project to Develop Roanoke River Basin

A START was made this year towards the construction of a large flood-control dam on the Roanoke River in southern Virginia. Two small, preliminary contracts, awarded by the U. S. Engineers, were completed at the dam site. One of the contracts covered the construction of an access road  $\frac{5}{8}$  mile long that will enable the site to be reached from an existing county road. The other contract involved clearing and grubbing about 125 acres on the left bank of the river, where the design calls for the building of an earth wing dike.

Congress has not yet appropriated funds for building the dam. But a law was enacted in December, 1944, authorizing construction of the Buggs Island Reservoir on the Roanoke River. This is considered a post-war public-works project. Its general plan embraces the comprehensive development of the Roanoke River Basin—primarily for flood control, but also for other purposes.

The site for the proposed dam lies in a sparsely populated area in southern Virginia. It is about 4 miles from the North Carolina state line, and takes its name from Buggs Island immediately downstream. From this point the Roanoke River flows southeast 18 miles to the state line. It continues through North Carolina to empty into Albemarle Sound on the Atlantic, 180 miles below Buggs Island. The site is situated in Mecklenburg County, and the community nearest to it is South Hill (pop. 1,739), about 17 miles to the northeast.

### Access Road

The site is reached by turning west off U. S. 1, 6 miles below South Hill, on to U. S. 58, and then following this road for about 5 miles before turning south on a dirt road for approximately 8 miles. The new access road begins at this point. It pierces the woods for  $\frac{5}{8}$  mile until the dam site is reached. The contract for construction of this access road was awarded to Chandler Bros., Inc., of Virginia, Va., on the low bid of \$54,868. Work got under way on April 10.

The contractor first cleared the 3.5 acres of right-of-way. Then 19,200 cubic yards of earth was excavated by a LeTourneau scraper carrying 18 heaped yards, pulled by a Caterpillar D8 tractor. Another D8 tractor-dozer leveled the fills, acted as a pusher when needed, and shaped the roadway to grade. The new cross section includes a 24-foot road flanked by 8-foot shoulders that have a slope of 1 on 12. After the balanced cuts and fills were finished, an 8-inch crushed-stone base course was laid for the full 24-foot width.

The stone was laid in two layers from a spreader box. Each layer was rolled by a 10-ton 3-wheel roller and then choked with screenings. More rolling followed the screening course so that the fine particles were thoroughly worked into the interstices of the stone base. A prime coat of 120 to 300-penetration cut-back asphalt was then applied to the top layer at the rate of 0.5 gallon to the square yard at a temperature of from 80 to 125 degrees F.

Next, a Barber-Greene bituminous finisher laid the 2-inch wearing course of hot-mix so that the surface had a center crown of  $\frac{1}{4}$  to 12.

The gradation of the stone base course, choker screenings, and asphaltic-concrete wearing course is as follows:

### Sieve Size Per Cent Passing

#### Stone Base Course

2½-inch	100
2-inch	90-100
1½-inch	35-70
1-inch	0-15
½-inch	0-5

#### Choker Course

¾-inch	100
No. 4	85-100
No. 100	5-25

#### Wearing Course

¾-inch	100
½-inch	86-100
No. 4	55-67
No. 10	40-54
No. 40	22-31
No. 80	12-20
No. 200	4-8

Bitumen (penetration 85 to 100) 5-6 per cent

The road was completed by the middle of June. W. L. Thornton was Superintendent for Chandler Bros., Inc.,

on this contract. It contained the following major items:

Clearing	3.5 acres
Excavation	19,200 cu. yds.
Reinforced-concrete pipe, 15 and 24-inch	355 lin. ft.
Crushed-stone base course	12,300 sq. yds.
Bituminous surface course	12,300 sq. yds.

### Clearing Dike Area

At each end of the proposed dam, a long earth embankment will extend to high ground. Clearing 125 acres of wooded area for this dike on the left bank of the river was the principal item in the \$14,070 contract awarded to R. R. Jones of Lawrenceville, Va. Acting as his own Superintendent, Jones began work on February 15 with a force of 60 men. He finished three months later about the middle of May. That time of year was the off season for farmers in the vicinity, who comprised most of his construction gang, so Jones had an adequate force at his disposal. He lives 18 miles east of South Hill and has a good knowledge of the labor market in that region.

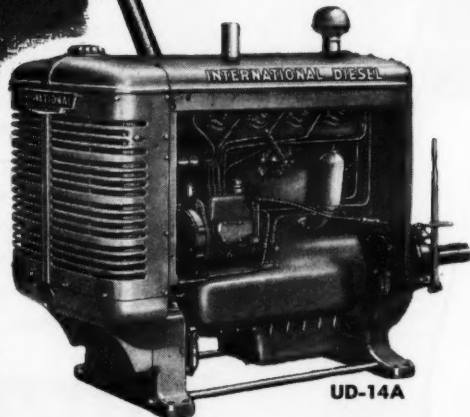
The area that was cleared is 11,000

feet long x 500 feet wide. It had a stand of pine, gum, oak, and some cedar trees, along with thick growths of underbrush. Part of the clearing was done by hand, with axes, saws, brush hooks, and machetes. And part of it was done by two Allis-Chalmers tractor-dozers, a No. 7 and a No. 10, and a Farmall rubber-tired tractor. The dozers were used for pushing out tree stumps and piling up brush. The rubber-tired tractor was rigged with a 30-inch circular power saw on its front end. This saw cut down trees with its blade in a position horizontal to the ground. Then, with its blade changed to a position perpendicular to the ground, it sawed the felled trees into any required lengths. Some of the larger trees were sold for commercial timber, in which case the trunks were left in one long piece. A great deal of the wood was sold for pulp, however, and in that case the trunks were cut into 6-foot lengths.

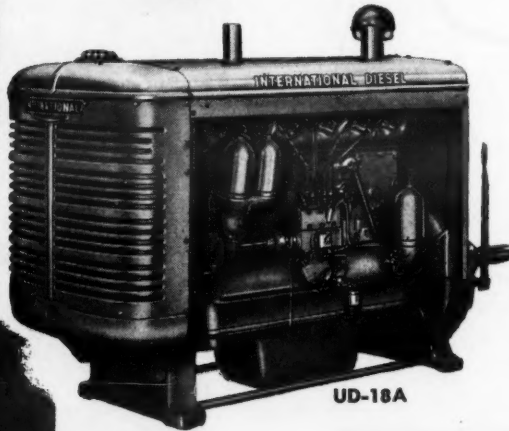
Trees between 4 and 12 inches in diameter (Continued on next page)

# HH Presents

## Another advance in INTERNATIONAL DIESEL POWER



UD-14A



UD-18A

**More Power!** The horsepower of two models of International Diesel Power Units has been stepped up by 11% and 25% respectively—without increasing their size or weight—as the result of advanced engineering in the fuel combustion system. These are the 4-cylinder, 76-hp. UD-14A and 6-cylinder 125-hp. UD-18A Power Units. Power ratings are for working horsepower of the complete unit with fan, radiator and power take-off.

**Greater Hang-on!** When pulled down by overload, increased torque gives these Diesels greater "lug-ability." And they are built to take overloads in stride!

**Better Operating Economy!** Even with horsepower stepped up, these Diesels run cool under heavy loads and operate at new low cost per horsepower. A low rate of fuel consumption proves their efficiency.

**Available Soon!** Look for these newest International Diesels in the powered equipment soon available through your International Industrial Power Distributor. And ask him for the facts and figures on these models. He has them now.

Industrial Power Division

INTERNATIONAL HARVESTER COMPANY  
180 N. Michigan Avenue • Chicago 1, Illinois

# INTERNATIONAL



# Industrial Power



## Work Starts at Site Of Flood-Control Dam

(Continued from preceding page)

meter were used chiefly for pulp. They were loaded by hand into trucks and hauled away to mills in North Carolina. Logs from the larger trees to be used for timber were loaded into trailer trucks by a truck-mounted A-frame and winch. By disposing of most of the growth in this manner, the contractor cleared the site more rapidly since only the brush had to be piled up and burned.

### Grubbing

Along the 500-foot clearing, an average width of only 125 feet had to be grubbed. This grubbing strip took in the 50-foot base width of the dike, a 25-foot lane on its upstream side, and a 50-foot lane on its downstream side. Roots were removed only from this area. When the trees were cut down, those over 3 inches in diameter were left with their stumps projecting 12 inches from the ground. Trees less than 3 inches in diameter were cut off 6 inches above the ground. The extra stump height on the larger trees permitted their being dozed out more easily by the tractors. When the stumps were too large for removal in this manner, auger holes were bored and they were then blown apart by dynamite.

The No. 7 tractor pulled a cable plow with two prongs, 12 inches apart, over the ground. The plow was the type



This map of the Roanoke River Basin shows the location of the proposed dam sites to control floods in the area. Work at Buggs Island has already started, though funds for the dam have not yet been appropriated by Congress.

used by the Army in laying field cables, and it cut out the roots to a depth of 2 feet below the surface. The severed sections of roots were then gathered up and burned.

The earth dike, which eventually will be built on this cleared and grubbed strip, will have a 15-foot crown at elevation 332 with 1 on 2½ side slopes. The height of the dike will vary according to the profile of the existing ground

### Buggs Island Project

The need for this flood-control project at Buggs Island was emphasized after the disastrous flood of August, 1940, in the Roanoke Valley. At that time, 50,000 acres of land in cultivation were flooded. Property damage to many farming communities resulted, and 4,000

people in North Carolina were forced to leave their homes and land. The primary purpose of the new development will be to control such destructive

floodwaters. It will also have for its objectives the production of hydroelectric power, and the reduction of pollution from sewage and industrial wastes downstream from the dam.

The dam itself, according to the design, will be built of concrete. It will be 2,797 feet long and 144 feet high, with the earth dikes running back to high ground on each side. A powerhouse will be located on the left bank. The concrete dam will be composed of different sections for various purposes. At the extreme eastern and western ends of the dam there are to be non-overflow sections. Between these there will be a rather long spillway section and a powerhouse intake and service-bay section.

In order to establish the elevation of the top of the dam, it was necessary to predetermine (1) the volume of storage required to retain the maximum flood from which protection is provided, and (2) the volume of water required for power production. After thorough con-

(Concluded on next page)

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PNEUMATIC TIRE MOUNTED  
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- \* Ideal for SMALL JOBS with BIG JOB capacity

The Model 36 incorporates all of the proved features of the famous Wood Roadmixers, Models 48 and 54, plus maneuverability, speed and self-propulsion. Ask your local Wood Roadmixer Dealer or write direct to the Wood Manufacturing Company for your copy of Bulletin 36. It gives complete details and specifications on this sensational, self-propelled traveling mixing plant.

2-36

**WOOD MANUFACTURING CO.**

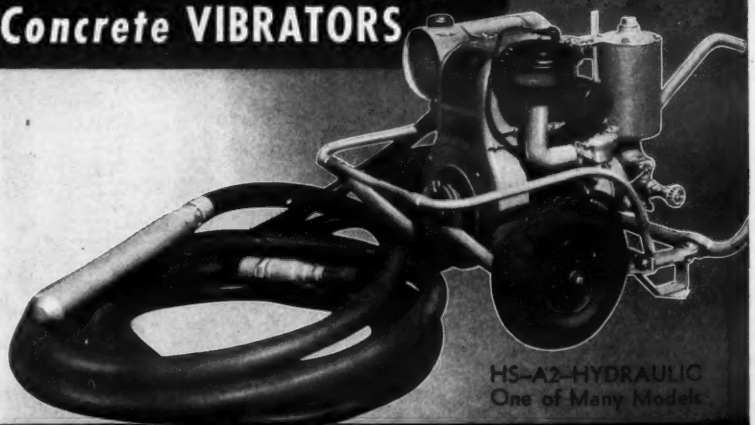
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The LINE That  
**EXACTLY**  
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ELECTRIC — FLEXIBLE SHAFT — HYDRAULIC  
**Concrete VIBRATORS**



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One of Many Models

**ELECTRIC TAMPER & EQUIPMENT CO.**  
LUDINGTON MICHIGAN



## Work Starts at Site Of Flood-Control Dam

(Continued from preceding page)

sideration of all factors involved, the elevation of the maximum flood-control pool was established at 320, and the elevation of the maximum power pool at 300. Thus the lower portion of the reservoir will be devoted to power production and the upper portion to flood control. Although the maximum flood-control pool is established at elevation 320, the dam will be constructed to an elevation 12 feet above this point. This 12-foot "freeboard" is simply a safety allowance.

There is another very important consideration in planning a project such as this. It is the capacity of the spillway to release water fast enough to prevent the reservoir from rising too high during a flood of unusual size. The dam, as it is now designed, will have openings large enough to pass a flood three times as great as the August, 1940, flood, the maximum on record on the Roanoke River.

In providing a reservoir to accomplish the objectives of this project, 51,200 acres will be inundated by the maximum power-control pool, and 87,900 acres by the maximum flood-control pool. The reservoir will have a total storage capacity of 2,921,000 acre-feet, with 1,085,000 acre-feet for power storage. Power production is a secondary objective. It is provided only to the extent that it will not interfere with the ability of the project to provide adequate flood protection. With these objectives will come improvements of fish and wildlife conditions; regulation of the low-water flow downstream of the dam; and creation of useful recreation areas.

The reservoir will extend upstream into Mecklenburg, Charlotte, and Halifax Counties in Virginia, and Warren, Granville, and Vance Counties in North Carolina. The drainage area embraces 7,800 square miles.

Along with these two preliminary contracts, exploratory subsurface investigations were carried out on test borings, test pits, and various soil analyses. Further progress depends on when Congress makes funds available to the War Department for work to begin on the dam itself. A project of this magnitude will probably employ 2,000 men directly. Most of them will have to be housed at the dam site since no facilities are to be found in this rather remote and thinly settled region.

The Buggs Island flood-control project is under the supervision of Col. R. E. Cruse, C. E., District Engineer, U. S. Engineer Office, Norfolk, Va.

### Spiratube Carrier

One man can carry long lengths of Spiratube with a combination carrier and storage rack recently announced by The Warner Brothers Co., maker of this flexible tubing. The carrying rack, Spira-Tote, is made of steel, finished with enamel. Spiratube is slipped onto the carrier, and compressed to about one-eighth its length. Various sizes of racks are available to accommodate various lengths and diameters of the tubing.

Further details may be secured from the company, Dept. 23, 325 Lafayette St., Bridgeport 1, Conn.

### Perforated-Metal Screens

A new edition of its "Handbook of Perforated Metal Screens" has been issued by the Morrow Mfg. Co. This Bulletin 70 contains illustrations, data tables, specifications, and standard-practice information on the various

types of perforated-plate screens: the flat, step, conical, and cylindrical.

Readers of CONTRACTORS AND ENGINEERS MONTHLY can secure copies of Bulletin 70 on mention of this notice. Write the McNally Pittsburg Mfg. Corp., Pittsburg, Kans., Morrow's parent organization.

### Follin in FWA Post

James W. Follin, who has been since 1939 Managing Director of The Producers' Council, has been appointed Assistant Administrator of the Federal Works Agency. Mr. Follin has held a number of official and semi-official posts in the construction industry, among them the secretaryship of the Construction Code Authority in NRA days. He has been Chief Engineer of the Philadelphia Federation of the Construction Industry, advisor to the RFC, and member of the Public Works Construction Advisory Committee of FWA. He has also held engineering posts in Pennsylvania and Michigan.

## Caine **CORR-PLATE** Steel Piling



Used the world over for building Foundations, Dams, Retaining Walls, Docks, Levees, Bulkheads, Sewers, Disposal Plants and thousands of other construction jobs.

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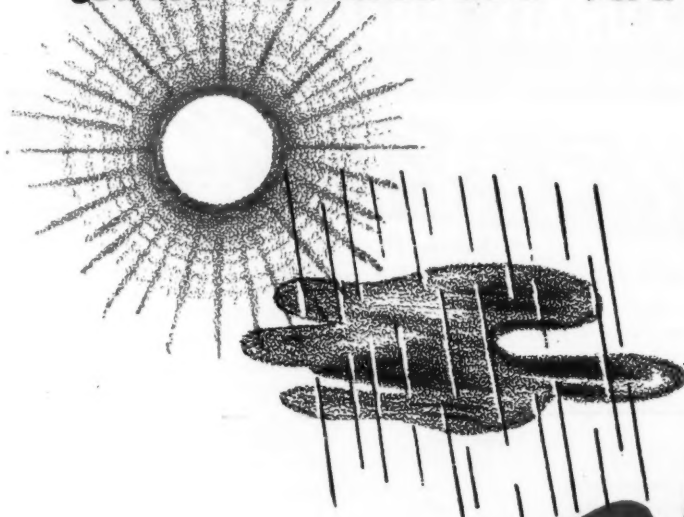
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COMPRESSORS**  
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SCHRAMM completely water-cooled machines function perfectly even with the compressor doors locked, thereby eliminating the hazards of grit, dust and theft.

SCHRAMM portable or stationary units are compact, light-weight and push-button controlled, provide continuous operation, and show record economies in operating and maintenance costs.



SCHRAMM No. 315 Air Compressor operating three heavy-duty jackhammer drills.



Quarry operations powered by a SCHRAMM Air Compressor.

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THE COMPRESSOR PEOPLE  
**WESTCHESTER  
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The new Pioneer apron feeder is completely portable for quick and easy set-up at crushing and screening plants.

### New Portable Feeder For Crushing Plants

Another post-war development by the Pioneer Engineering Works is its new portable apron feeder for use with crushing and screening equipment. This new Pioneer feeder is in effect a portable conveyor for heavy sharp abrasive rock or for similar materials and conditions where a belt conveyor is impractical. Mounted on its own chassis and wheels, with hopper attached, it can be swung into place quickly for short-time set-ups.

The unit, which is now made in a 36-inch width, measures 30 feet from center to center of head and tail shafts. It is supported on a single axle equipped with dual pneumatic tires. Steel wheels are optional. The frame is built from rolled channels, truss-braced to prevent weaving and distortion. The feeder pans are of 1/2-inch-thick forged steel plate, with overlapping corrugations to give added strength against impact and load and to prevent slippage of material. Malleable castings are bolted to the ends of the pans and are interlocking to prevent spillage at the sides. Adequately braced sideboards further prevent spillage and leakage. The pans are carried by three steel chains riding on hardened rollers. Three steel sprockets carry the chains at the head and tail ends. Return idlers support the pans under the feeder.

Drive is from the crusher to the feeder head shaft through a clutch and built-in gear reduction. The principal gears are steel-cut, and the main driving chains are of the roller type. The drive mechanism is covered to protect it from dirt and weather. A hinged cover over the gears provides for ready inspection.

Interested contractors and state and county highway engineers may secure further details on this new apron feeder direct from Pioneer Engineering Works, 1515 Central Ave., NE., Minneapolis 13, Minn. Just mention CONTRACTORS AND ENGINEERS MONTHLY.

### Reduces Corrosion In Cooling System

A new device using the principle of electrolysis to remove old scale from the water-cooling systems of internal-combustion engines, and said to prevent new scale from forming has been introduced by the Butler Engineering Co.

Guaranteed for a minimum of one year, or 25,000 miles, the De-Scaler is a spring-and-core unit that fits into the top hose connection, or is dropped into the top of the radiator. Dissimilar metals in the self-energizing galvanic cell produce an electrolytic action when immersed in mineral-bearing water. The spring is silver-plated and the core is made of a special Butlmetal which decomposes as the result of the electrolytic action. The decomposing metal particles attach themselves to the minerals in the water, precipitating them to the radiator bottom for easy removal, Butler says. Besides removing the old scale, De-Scaler is said to prevent corrosion of various types; the Butlmetal attracts the corrosive elements in

the water to itself, and away from other metal parts of the cooling system.

A silver-plated spring coil that can be cut to fit the hose connection holds the De-Scaler in place. The entire unit does not affect the action of anti-freeze solutions, nor is it affected by them, Butler claims.

You can secure full details on the De-Scaler if you write to Department 372, Butler Engineering Co., 926 Magazine St., New Orleans 11, La. Mention this story.

### Builds Diesel Engines

Devoting itself exclusively to the building of diesel engines, the R. H. Sheppard Co. of Hanover, Pa., makes diesel power units in sizes from 3 3/4 to 56 hp, generating sets in the 2,000 to 36,000-watt range, and marine propulsion engines from 3 3/4 to 62 hp. These horsepower ratings are for continuous operation and are the actual power output of the engine while operating with all equipment, Sheppard says.

With nearly all the parts built in Sheppard's own plant, the firm's diesels are said to be integral units with coordinated design throughout. Conceived to meet the need for a small self-contained power source, they are designed to be put into service without the addi-

tion of a single accessory.

The firm adapts its diesels to such users' needs as pumping sets, compressors, marine auxiliaries for dredging contractors, and the like. It offers parts and service outlets through distributors scattered across the United States and abroad.

The full story of the diesels built by Sheppard is told in a 12-page brochure available on request. Mention this notice and ask for Bulletin D-100-4. If you want a diesel for a specific application, outline your needs and Sheppard will be glad to help you.

### Resigns From Littleford

Dawson Carter has assumed many of the duties relinquished by John Strobel on his resignation as Assistant Sales Manager of Littleford Brothers, of Cincinnati, Ohio. Mr. Strobel associated with the maintenance-equipment firm for fifteen years, plans to form his own heating and ventilating firm.

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- Enables you to get icy spots covered faster
- Speed to danger spots, start spreading without stopping truck
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- Operated entirely by driver with clutch control in cab
- Spreads all granular materials up to 1", wet or dry
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- Does not limit use of truck—won't interfere with dumping
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Flink Spreader with safety protective housing over spreader blades and clutch. Hydraulic drive and rear wheel chain drive models.

### USE FEWER MEN, TRUCKS, TIME

New simplified construction, installation and maintenance, new ease of operation... but basically the same practical, economical, efficient Flink spreader that has proved itself in a thousand tough road construction and maintenance jobs... in ice control and dust control all over America.

FLINK COMPANY, DEPT. 674, STREATOR, ILL.





A Sno-go rotary plow and a Bay City shovel team up to open a highway in the state of Washington.

## State Crews Fight Winter's Icy Grip

Keeping Mountain Passes Open on State Highways Is a Winter-Long Battle With Snow and Ice

† THERE are 6,000 miles of state and Federal highways in the state of Washington, and nearly 75 per cent of that mileage sees snow sometime during the year. At least 250 miles, through mountain passes, are subject to severe storms with up to 18 feet of pack snow and ice. So real is Washington's snow-removal problem that last winter nearly \$500,000 had to be earmarked for that item out of a \$6,000,000 maintenance budget.

Washington is the state with the Dr. Jekyll and Mr. Hyde climate. Its western half, towards the ocean from the Cascade Mountains, is a land of heavy forests, rain, and snow. East of the Cascades, however, Washington is a land of dry arid plains, with mesa land and buttes. When this land is irrigated it is among the most productive in the world, and during the winter it gets colder than the Pacific Ocean half, with plenty of dry fluffy snow.

It was this very characteristic of east-west difference which first made snow removal necessary early in the days of the automobile. For much of the produce from the eastern part of the state moves west over highways towards the coast cities. Stevens Pass on State Route 15 and Snoqualmie Pass on U. S. 10 carry much vital traffic.

Keeping in mind the efficient maintenance of highways, including snow removal, the Washington State Department of Highways at Olympia some years ago divided the state into six maintenance districts. Each district has its district engineer, maintenance engineer, and separate labor force. There is an overlap of highways subject to heavy snowfall from one district into another to take care of the snow with a minimum of equipment. Heavy single-purpose Sno-go rotary plows from District 5 keep the mountain passes open over the ridge and down the other side, well into District 1, to a point where truck-mounted push plows can take care of the situation. This same scheme is repeated to the north.

This system of equipment conservation has enabled the State to get along with less equipment than a duplication of effort would require. District 5 operates six Snogos, one in each principal mountain pass in that territory. It also uses one Bros Sno-Flyer rotary plow, ten truck-mounted push plows, and motor graders with snow plows

mounted on the front end.

During March of this year a traffic check was made in Snoqualmie Pass. It illustrates how much of a problem automotive vehicles can be during snowstorms. Snow removal was in progress over this pass during the month, but just the same 22,000 heavy trucks used the pass that month, and 216,000 passenger cars were counted!

### Chains on Passenger Cars

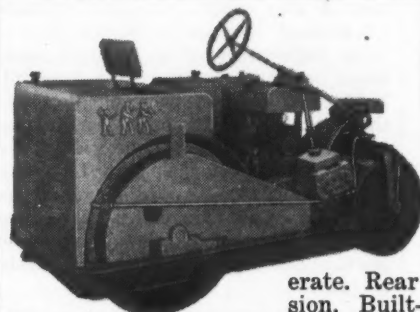
When a pass is snowed in, and the plows are all out trying to get it cleared while sanding crews are trying to get a little sand scattered on the icy grades, there is always on hand a certain type of motorist who causes the maintenance crews, the state patrol, and other travelers no end of trouble. This motorist is the chap who hasn't any chains for his automobile. He looks the warning signs over in disbelief and says, "Aw, this can't be so bad; I think I can make it".

He makes it about halfway, comes upon a slow-moving truck, and finds it

impossible to pass. The minute he slows down below high gear, he's sunk, and so are the other individuals strung along down the mountain road behind him. The pattern is so familiar to

snow-removal men that they would gladly shoot this individual if it weren't against the law. His automobile is soon crosswise on the highway and every-

(Continued on next page)



## A TOUGH ROLLER FOR TOUGH JOBS

Pierce-Bear 3 1/2-5 Tons Variable Weights

Engineered for economical operation where the going is tough. Compact, easy to operate. Rear roller gives heavy duty compression. Built-in water tanks for wet rolling.

Powered with Allis-Chalmers Industrial Heavy-duty Model "B" gas-line engine. Write for details.

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# Ballast...125 cubic yards HOURLY... WITH TELSMITH

- 1 TELSMITH Roller Bearing JAW CRUSHER
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Purchasing a quarry where former operators had been making large size rock products since 1896, Howard Smith of Vancouver, Washington, has about a million yards of reject smaller rock to crush before working main quarry. His plant, with its modern high speed Tel-smith Crushers, is now turning these rejects into ballast for the Spokane, Portland & Seattle Ry.

The material is first fed into a 25" x 36" Tel-smith Jaw Crusher with roller bearings for higher speed, greater capacity and lower power costs. Aggregate is conveyed to secondary crushing and washing plant alongside Columbia River. Here are two rugged high speed Tel-smith Gyraspheres—one for intermediate, the other for fine crushing. As operated at present, the plant's output is 125 cu. yds. hourly of 2 1/2" to 3/4" ballast. However, this combination of Tel-smith Crushers is capable of a far greater output, or much finer sizing when needed. Tel-smith Gyraspheres insure finer crushing, wider range of sizes, uniform cubical products, as well as bigger tonnage and lower upkeep.

Modernizing? Expanding? Building a new plant? Consult Tel-smith engineers. Get Bulletin Q-34.

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San Francisco 4—Los Angeles 14  
Wilson-Weesner-Wilkinson Co.  
Knoxville 8, & Nashville 6, Tenn.





The Washington State Department of Highways uses this shop-made "borer" to root snow out of snowbanks. Snow dislodged this way tumbles down where the plow can remove it.

## State Crews Fight Icy Grip of Winter

(Continued from preceding page)

thing is snarled for hundreds of yards on both sides of Mr. Smart Guy.

This winter the State Highway Department is going to take care of him. No, it isn't going to put him in jail, where he belongs. It is going to do this fellow a service. Arrangements are being made at this time with various small garage owners in the vicinity of these bad passes to rent chains.

It will work this way: Mr. Smart Guy will be stopped at the foot of the pass by newly erected control gates, closed to automobiles without chains when snow or ice conditions are bad. He will be told, "Sorry, you can't get through without chains".

But one of these garagemen will be on hand 24 hours a day with some kind of small pick-up truck. He will rent a set of chains to the motorist, or sell it to him outright. The rental charge will probably be something like 50 cents to a dollar and the mechanic will put the chains on. After he crosses the bad pass, the motorist can then turn the chains in to another service car at the other control gate, collect his cash deposit which the first man charged, and go on his merry way.

The Department has even figured out

what will happen to this harebrained character if he smashes off the road anyway, and winds up down in the bottom of a canyon, dead. He loses his deposit.

George Washington's birthday is a sort of deadline in the state of Washington. If they make it through February 22, without blocked highways, everybody sighs with relief, because from there on until summer it's a downhill battle. While it is true that some of this downhill battle consists of removing hard, encrusted snow left over from previous storms, that is pretty much the same as an ordinary excavation job. The Department can even estimate costs for this item at 50 cents a cubic yard and be reasonably accurate.

### Methods of Snow Removal

In early November, snow starts falling in the high mountain passes 5,400 feet above sea level. As the weeks go by it works lower and lower, until by January 15 almost all of the state

over 1,000 feet high is covered by a snow blanket.

Washington's snow-removal methods are geared to the general policy that the more work done on this snow at the time it falls, the less the job in the spring. Trucks in all districts are equipped with push plows. After September 15 no truck moves anywhere on a transfer order without carrying its push plow along.

When snow begins to fall, these truck-mounted push plows maintain a steady patrol, working light snow off from the center stripe towards the sides. In curves with steep-walled rock faces and an outside embankment, the plow operators try to work the snow off the embankment side.

When a windrow of snow has been created in sufficient quantity to crowd in on the push plows, a Snogo rotary plow comes in and casts off to the side. Snogos work steadily throughout the winter.

The most unusual situation in the state is in Chinook Pass. This road is

not heavily traveled, and the Department frequently lets it block. In the spring a Snogo is brought in, but a bulldozer has to be used to feed the snow plow. The district in which this work is done generally uses a Caterpillar with an Isaacson bulldozer blade. By the time this road is being opened, the snow pack is strong enough to support a D6 Caterpillar tractor.

Sometimes severe icing occurs in these thick packs. When that happens the Department uses a power shovel with an oversize snow dipper, and removes the snow by casting. Many years back the removal of snow was done by contract, and the dipper now used for this work was purchased from one of those early contractors.

As a matter of fact, the state has a law handed down from that day which applies to all maintenance work. Any job over \$2,500, whether it be construction or maintenance in any form, has to be advertised. Then if there are no bidders, the state goes ahead with the

(Concluded on next page, Col. 3)



...keeps Heil Hydraulic Bulldozers on the job doing more Low-cost Work for You

Because Heil hydraulic Bulldozers move more dirt at less cost, they are general favorites with Oliver-Cletrac users everywhere. These contractors like the quick, accurate blade control; the full visibility; and the fast digging action made possible by the Heil hydraulic system. They know that the scientific contour of the Heil Bulldozer blade, with its reversible cutting edge, gives a bigger load-carrying capacity than you get with conventional units.

All these things result in more work done, but that isn't all. There is one more feature of tremendous importance — dependable strength. The trouble-free hydraulic system, for example, is practically leak-proof. Large diameter cylinders permit the use of low

hydraulic operating pressures. Piston rods are chrome-plated to prevent rusting and pitting. The tolerance between the piston and its finely honed cylinder is so close that there is seldom, if ever, any need for time-consuming piston replacement.

Heil's all-welded box-section construction provides unusual strength; there is no dead weight to slow down the work. Tailor-made for Oliver-Cletrac tractors, the Heil hydraulic Bulldozer is attached by means of sturdy connections in such a way that there is proper distribution of loads and stresses. That is why Heil hydraulic Bulldozers stay on the job — turning out low-cost work. See your nearest Oliver-Cletrac distributor for further important details.

**Low Cost Per Ton-Mile**  
**Manganese Tracks**  
**Contour-following Traction**  
**Sturdy Construction**  
**5 to 50 Tons Capacity**  
**Negotiates Steep Grades, Mud, Snow and Ice**

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 all the highway vehicles

**THE HEIL CO.**

GENERAL OFFICE • MILWAUKEE, WISCONSIN





The use of Mayari R high-strength low-alloy steel in the 42-foot dipper stick of this Lima shovel resulted in a weight saving of approximately 30 per cent. Mayari R, a product of Bethlehem Steel Co., is said to have a yield point of about 1½ times that of mild-carbon steel and it can be fabricated without extra cost. It is also possible to weld it by all ordinary methods.

## Welded-Steel Design For 25-Ton Trailer

A semi-trailer designed and built for heavy-equipment hauling, the M-H 25, has been announced by Miller-Hasselbalch & Co. Featuring welded-steel construction throughout, the trailer has a 25-ton capacity.

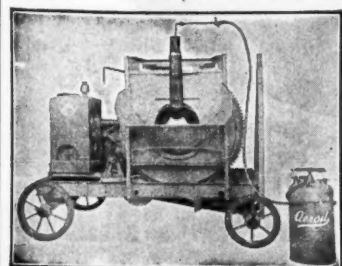
The M-H 25 has oscillating trunnion axles for smooth hauling, Miller-Hasselbalch says. Its gooseneck is part of the frame, affording a strong connection with less weight. Tapered roller bearings, air brakes, and steel wheels feature the 25's chassis. Its platform of 2-inch plank is 8 feet wide and stands 3 feet above the road. The unit weighs about 7,500 pounds.

You can secure all the details about this semi-trailer for use with trucks by writing Miller-Hasselbalch & Co., 215 No. 12th St., Omaha 2, Nebr. Tell the manufacturer you saw this notice.

## Quick-Use-Concrete Data

The advantages of a "quick-use" concrete are outlined by the Pennsylvania-Dixie Cement Corp. in a 16-page booklet devoted to Penn-Dixie high-early-strength cement. Methods of mixing and curing, tips on concreting in cold weather and making watertight concrete, as well as tables of compressive strengths and recommended mixes, are found in this booklet; it may be secured from the firm on mention of this

## HOT CONCRETE



FREE BULLETIN No. 208

Don't risk batch failures due to frost. Pour HOT CONCRETE... it will stay warm 48 to 60 hours... long enough to set properly. AEROIL Concrete Heaters to fit all sizes and shapes of mixers. In stock for shipment.

### STEAM THAWER



FREE LEAFLET No. 377

Thaw out hydrants, culverts, gasoline lines and engines with LIVE STEAM from a portable AEROIL No. 98 steam thawer. A 2-in-1 machine for the heating unit is a thawing torch. Steaming rate 90 lbs. per hour.

**THAWING TORCHES**  
Keep jobs running despite ice, sleet, snow or frost. AEROIL Thawing Torches and Thawing Outfits produce 2000° F. Flame and operate despite high winds. No. 99 Senior only \$22. (4-gal. model) and can be shipped from stock. Write today for complete bulletin No. 294 on THAWING OUTFITS.

AEROIL PRODUCTS CO.  
5775 Park Avenue  
West New York, N. J.

## State Crews Fight Icy Grip of Winter

(Continued from preceding page)

job but must advertise its final costs. The price of 50 cents per cubic yard for snow removal is average. In extremely favorable conditions, where push plows handled snow which soon melted, prices have dropped to 18 cents a cubic yard. By the same token, some of the ice blockades in Chinook Pass have cost up to \$1.50.

Since new equipment, particularly trucks, is at a premium in Washington, costs have risen with the high repair bills on well worn trucks. According to Maintenance Engineer J. H. Marshall, it is now necessary to keep six trucks on a job to have three working. The maintenance shops in all six districts are constantly busy, and they are doing a creditable job. But Marshall is certainly hoping the day will come before long when worn-out equipment can be replaced.

## Personnel

J. H. Marshall is State Maintenance Engineer, with headquarters in Olympia. Ken Miller is the Assistant Maintenance Engineer, and William Wacker is the State Equipment Engineer.

## Gas, Arc-Welding Data

### Feature Big New Catalog

Welders will be interested in a new and complete catalog of all Hollup electrodes and National oxyacetylene gas welding rods which has been issued by the Hollup Corp., a division of National Cylinder Gas Co.

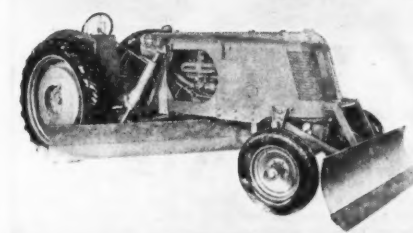
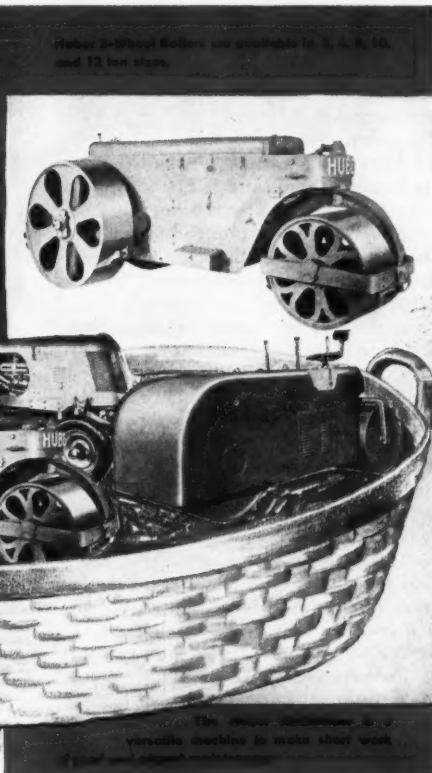
Complete detailed descriptions of the whole line of Hollup electrodes are given, with recommendations on ranges and sizes to be used. Tables show the weldability of metals, electrode consumption rates, and other data. Welding terms are defined.

You can obtain this 64-page catalog by writing the Hollup Corp., 4700 W. 19th St., Chicago 50, Ill. Tell the firm you saw this notice.

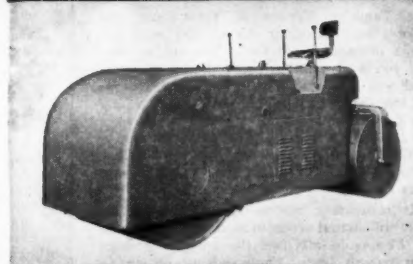
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MAINTAINERS**



# Graders Now Blade Kit Carson's Road

## Part of the Historic Great Southwest Trail Is Now Maintained by County Road Forces

† NO part of our nation's history is greater than the struggle of brave men and faithful women against the frontier wilderness of the early 1800's. The names of Lewis and Clark, Daniel Boone, and Kit Carson are enshrined in glory because these great explorers dared to hack a pathway westward from the Appalachians towards the Great Plains.

Today, a century and a quarter later, county road forces in central Arkansas are maintaining a part of that trail as a county highway system. Except for Indians, the problems are much the same: rolling terrain, soft-clay mud in winter and spring, and dust in summer. But motor graders now dress highway shoulders where Kit Carson, the master scout of them all, once trod on silent moccasins.

The county is Pulaski County, richest of all Arkansas counties. The state capitol is located there, and it has a longer history than perhaps any other part of the state. The early pioneers, and the Indians and buffalo before them, established the Great Southwest Trail, which led from Pierre Choteau's fur-trading post at St. Louis towards Hot Springs and the Texas Territory. They came upon a natural landmark, *la petite roche* (the little rock), where an all-weather crossing of the wide Arkansas River might be made, winter or summer. And so arose the first settlement of the state, named for the little rock.

In order to make an appraisal of Pulaski County's present highway system, it is necessary to know these historical facts. It is desirable to meet its people: men whose finely drawn Spenserian features reflect mountaineer ancestry. And it is also revealing to drive over Pulaski County's 1,000-mile-long road system, bordered by cypress and dogwood trees as were the trails in the early days, for only by so doing can one appreciate what a great service that system is now rendering.

### Roads, Drainage, Bridges

Of the total county road system, 108 miles are paved, largely of asphaltic concrete. Approximately 400 miles are stabilized with gravel or crushed stone. The remaining 500 miles are classed as unimproved, but these earth roads are kept in proper shape for drainage by motor graders when they need dressing. Pulaski County also opens and maintains many a mile of graded road which connects farm homes with main highways. These seldom show on the county books, but work goes on nevertheless.

Pulaski County is filled with streams of all sizes, which drain generally towards the center of the county into the Arkansas River. An annual road upkeep and construction program, for



C. & E. M. Photo

Pulaski County uses its Link-Belt Speeder 5 1/2-yard shovel to load crushed rock from a private pit for use on county roads.

which approximately \$250,000 is budgeted for the current fiscal year, must

somehow provide for the repair or new  
(Continued on next page)

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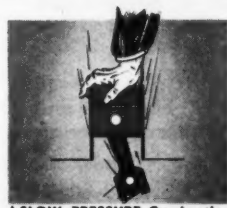
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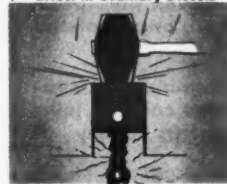
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Effect in Ordinary Diesels







C. & E. M. Photo  
An Adams motor grader blades one of the gravel roads in Pulaski County.

## Graders Now Blade Kit Carson's Road

(Continued from preceding page)

construction of bridges to carry these roads across the streams. During the past few years funds were limited and no concrete bridges were built, but 172 new timber structures from 4 feet to 105 feet long were built last season. A realization of the amount of timber bridge work done in Pulaski County may be gleaned not only from this fact, but also from the fact that this County last year repaired 229 timber bridges and 32 box culverts, built 343 box culverts and 108 drive-ins over drain ditches at the bottom of highway-shoulder ditches.

During WPA days, several modern and permanent concrete bridges were built. But the number constructed was inadequate. Pulaski County has consequently been forced to resort to the shorter-lived timber structures. Plans now are under way, in line with the urban portion of the new Federal-Aid program for secondary roads, for the realignment of certain sections and the construction of permanent concrete bridges as rapidly as possible.

### Organization and Finances

The Road Department of Pulaski County is governed by the citizens, who elect a County Judge. This office now is held by the Honorable L. A. Mashburn. Judge Mashburn appointed a Road and Bridge Commissioner, J. E. McCook, in accordance with the law. Mr. McCook took over his present work in 1944, but he is no newcomer to the Pulaski County Road Department; he held this very same position over 20 years ago.

Judge Mashburn's office is in the Pulaski County Courthouse in Little Rock, which is only about two city blocks from the County Garage, where Mr. McCook's office is located. Mr. McCook has an assistant, a bookkeeper, a shop foreman, and 61 other men on the county payroll at the present time. Included in that total are power-grader and bulldozer operators, bridge carpenters, welders, automobile mechanics, and laborers.

Funds for road construction and maintenance are primarily derived from millage tax, the per capita road tax, and a proportionate distribution of state revenue derived from taxes imposed upon highway users.

The ad valorem tax of three mills has been levied in Arkansas for many years. It is uniform, and has yielded increased revenue each year for the past several years due to satisfactory tax collections and to some increase in the assessments for tax purposes. The per capita road tax is a \$4.00 per year levy imposed upon all male citizens under 45 years of age. This yields a variable but sizable sum each year.

### County Plans

Pulaski County is unusual in that it

is ready for the new Federal-Aid program, but it is also about eight years ahead of Public Roads Administration. Pulaski County boasts the only county planning board in the state.

The Pulaski County Planning Board was established in April, 1937. It was set up under Act 246 of the Arkansas Legislature. It is one of three planning agencies in the state. Since its inception, the Planning Board has issued much valuable information in the form of reports, as follows:

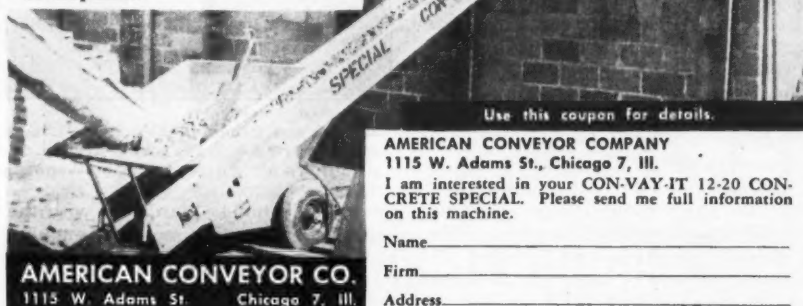
- (a) "A Preliminary Report" (1938) which contains a great deal of basic and factual data on types of soil and land use in the county.
- (b) "A Primary Highway Plan" (1939) which is one element of a comprehensive long-term plan for the development of a county-highway system.
- (c) "A Real Property and Low Income Housing Area Survey" (1940).
- (d) "A Water Report" (1940) concerning the control and utilization of this natural resource. It contains facts

(Continued on next page)

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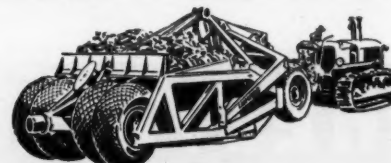
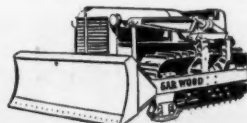
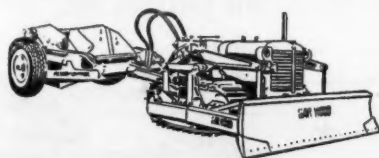
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## Graders Now Blade Kit Carson's Road

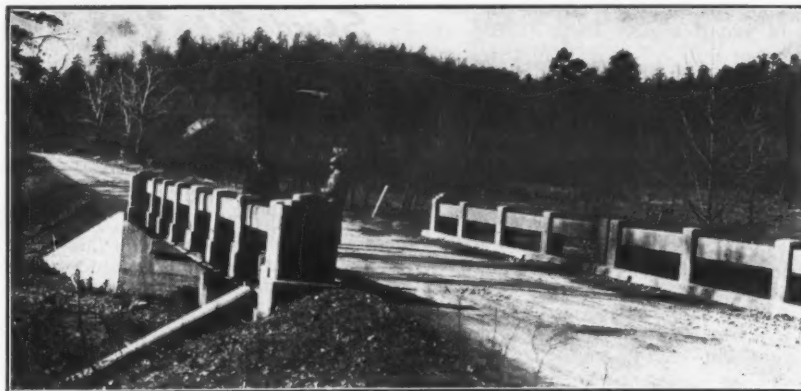
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on flood control, drainage, hydroelectric power development, and domestic water supply.

(e) "An Industrial Site Survey" (1943).

(f) "A Late Revision of the Roads Section of the Public Works Report" (1945).

In the development of Pulaski County's long-range program were involved a number of considerations and recommendations which other counties might well wish to note. In the first place, the study showed that the county was fairly well served by present roads. It seemed therefore—and this was the Planning Board's recommendation—that existing roads should be improved and maintained; that the county road



C. & E. M. Photo

McCook and Bandy of the Pulaski County, Ark., Road Department inspect one of the concrete bridges on the county system. The County's Planning Board program calls for the construction of many more such bridges.

fund should not be burdened with the expense of opening and maintaining new roads unless such routes would serve a definite and much needed purpose.

Many of the improved roads in Pu-

laski County were found by this Planning Board to be far short of present-day standards for modern highways because of poor alignment. Frequently this was the result of building modern

roads on old-fashioned right-of-ways. Since Pulaski County was a pioneer automobile-road builder in the state of Arkansas, this was particularly true. Many of its roads were constructed to meet the standards of another day.

When improvement was undertaken, it was often found a costly and tedious task to acquire the desirable right-of-way. Because the proper alignment would have required new drainage structures which would have then added excessive cost to the project, it was found much easier to make the improvements on the existing right-of-way. The Board found it sad but true that its county had about the most obsolete road alignment in the state.

It therefore recommended a broad pay-as-you-go plan for the expenditure of as much money as possible for the realignment and new construction of those obsolete parts of its system. It did not believe that extensive mileage could be built at once. It did, however,

(Continued on next page)

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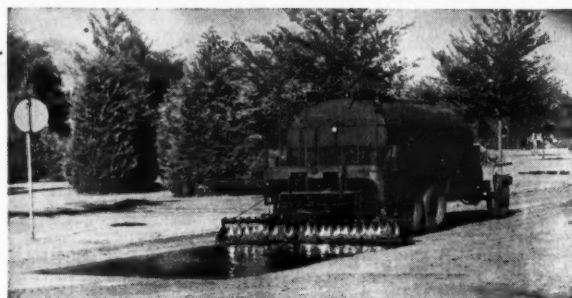
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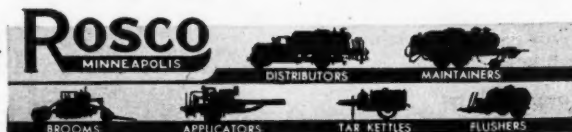
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C. &amp; E. M. Photo

In the usual order are E. W. Ford, Pulaski County Shop Foreman; C. P. Sandy, Bookkeeper; and J. E. McCook, Road and Bridge Commissioner in Pulaski County, Ark.

\$0.25 per ton. A 1/2-inch topping of fine armor coating was applied after the 2-inch strip had been rolled. The costs on this project were as follows:

## Labor, Equipment Rental, Miscellaneous

Foreman	24 days @ \$5.77	\$ 138.48
Asphalt spreader	16 days @ 5.96	95.36
Asphalt spreader	10 days @ 8.20	82.00
Roller operator	22 days @ 5.00	110.00
Roller operator	5 days @ 5.96	29.80
Water-truck operator	16 days @ 5.39	86.24
Truck drivers	166 days @ 4.81	798.46
Trucks	166 days @ 6.49	1,077.34
Gang trucks	18 days @ 6.49	116.82
Gang guard	11 days @ 5.20	57.20
Laborers	41 days @ 3.46	141.86
Prisoners	89 days @ 2.50	222.50
Spreader rental	26 days @ 21.66	563.16
Moving rollers		24.00
Fuel and oil for rollers and spreader		68.03
Laboratory fee (3,151.02 tons at \$0.25 per ton)		787.75
Miscellaneous		77.31

Subtotal \$4,476.31

## Materials

Prime coat	12,770 gals. (\$0.10)	1,277.00
Asphalt binder	235,986 tons (\$4.65)	10,973.35
Asphalt armor	79,116 tons (\$4.65)	3,678.89

Subtotal \$15,929.24

Total cost (pavement 3 miles long)	\$20,405.55
Average cost per mile	6,801.85
Actual paving time (July 31-August 25)	16 days

As may be seen in the above cost recapitulation, labor and materials in

Pulaski County are somewhat less expensive than many county engineers find in their community. Prisoners from the county jail also contribute towards a general lowering of road costs, and this is excellent economy both for the Road Department and the sheriff's department.

Mr. McCook, the Road and Bridge Commissioner, supervises all construction and maintenance activities from

the County Garage. He gets his orders on policy from Judge Mashburn, and works out all details on road upkeep himself. Mr. McCook farms equipment and operators out where they are most needed. Ordinarily his pulled graders, used to keep ditches open, have to remain idle for the most part during the wet winter months. But an extraordinarily nice premature spring

(Concluded on next page)

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## Graders Now Blade Kit Carson's Road

(Continued from preceding page)

provide that several miles be built each year, resulting eventually in paved roads in all sections of the county. This was based on the utterly sound common-sense theory that traffic would tend to gravitate towards these new paved roads, thereby reducing maintenance requirements on gravel and graded earth roads.

The secondary-roads portion of the new Federal-Aid plan will undoubtedly help Pulaski County, but it will only serve to reinforce what this community had already started to do for itself.

The Planning Board also recommended a progressive replacement of wood culverts and bridges with permanent concrete structures. Wooden drainage structures particularly were found very costly items to maintain, as well as potential and frequently actual hazards to highway safety. The Board believed that if the new structures were properly designed, particularly with respect to load requirements and ample openings, the first cost would be, except in rare instances, the last cost.

This program is already under way. Wooden drains have been replaced with concrete pipe along many of the roads, and a few culverts have been built. Several new sections of bituminous pavement have been built, among them the new section on Base Line Road and one portion of the Upper Hot Springs Road.

## A Bituminous-Road Project

In the latter case, the new pavement was placed on an existing gravel highway which met Planning Board standards. None of the curves had less than a 300-foot radius. Maximum sight distance on horizontal and vertical curves was at least 800 feet, and bridge structures were adequate.

The old highway surface was dressed thoroughly by one of Pulaski County's Adams motor graders, and the shoulders and ditch lines were cut. The subgrade, 18 feet wide and 15,840 feet long, was then primed with approximately 1 gallon of MC-2 asphalt per square yard. It was applied by bituminous distributors.

Two inches of asphaltic concrete were then placed on the subgrade. This material was purchased from the hot-mix plant of the B. F. Jones Construction Co. At the time the county was visited for the readers of CONTRACTORS AND ENGINEERS MONTHLY, there was no record of the mix design, which had been controlled and tested by the Van Trump Testing Laboratory for a fee of

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## Graders Now Blade Kit Carson's Road

(Continued from preceding page)

day in January, when the job was visited, had brought all equipment out into action. Motor graders were blading the gravel roads.

### Equipment

Pulaski County owns 3 Caterpillar No. 112 motor graders; 3 Adams No. 302 motor graders; 1 International TD-18 TracTracTor; 1 Allis-Chalmers Model HD-7 tractor; 2 Caterpillar D7 tractors; 2 Caterpillar pulled graders; 1 Galion pulled grader; 1 Bucyrus-Erie 20-B shovel; 1 Link-Belt Speeder  $\frac{5}{8}$ -cubic-yard shovel; and 15 assorted dump trucks. Most of the paving equipment is now being rented, but the County owns a patch truck with a "hot pot"; a Galion 10-ton 3-wheel smooth roller; 3 rock crushers; and a 1,000-gallon water-tank truck.

All of this equipment is maintained and repaired when necessary in the county Garage in Little Rock. In addition to the usual run of small tools in such a place, the following equipment is used:

- 1  $\frac{1}{4}$ -ton chain hoist
- 1 hydraulic jack
- 1 Weaver 30-ton hydraulic press
- 1 bench vise
- 1 anvil
- 1 forge
- 1 Little Giant power hammer
- 1 drill press
- 1 Smith ac welder
- 1 bench grinder
- 1 oxyacetylene welding and cutting outfit.

**The County's Past in Its Present**  
While so much of Arkansas is mod-

ern, it is still remarkably easy to look at present-day operations and visualize the days of long ago. Then the early settlers cleared the land, and military engineers under Major John Pyeatt built a 50-mile trail along the north side of the Arkansas River through present Pulaski County. This trail has since gone down in history as famous Pyeatt Road, traveled by stagecoaches of the period. Even today the problems are reminiscent of the past.

When a farmer gets a new road approved, he still clears his site of trees as clearing was done in the early days: with an axe. It is true that the pine and cypress stumps are pulled out these days by cable slings hooked to the drawbar pin of a Caterpillar D7 tractor, and grading is done by power equipment. But at the stage when pine stumps lead towards a tiny cabin, with smoke circling lazily in crisp morning air and a brace of mules grazing near by in the woods, it seems as though all the folklore of this entrancing region has been retained over the years.

It seems apropos at this time, when the old way is moving out in favor of the new, to remember these trails made by Kit Carson and others. They were the basis for a highway system which will be second to none in the near future.

### Patten's New Quarters

The new "home" built by the Patten Tractor & Equipment Co. in the Chicago suburb of Bellwood is featured in the brochure "Patten Progress" just issued by the firm. Occupying three acres, the new headquarters at 620 So. 25th Ave. will have sales, parts, and

service facilities for Caterpillar, Athey, Trackson, Hyster, and other lines of contracting equipment. The booklet will be sent on request.

### Small Compressor For Varied Service

A wartime development for use in areas where temperatures vary greatly, the T-1 air compressor is now being offered by Westinghouse Air Brake Co. to contractors and highway departments for use on trucks, tractors, and other equipment. The T-1 is described as a light, compact, and versatile unit with either gasoline-engine or electric-motor drive. Its applications include servicing tires, either on a field truck or in a garage, and the operation of pneumatic tools within its recommended operating pressure of 75 psi for intermittent use.

The T-1 is designed to deliver oil-free air, Westinghouse says. It operates under conditions ranging from 40 degrees

F below zero to 130 degrees above. It has a displacement of about 3.27 cfm at 600 rpm, and can be operated at 1200 rpm with a displacement of 6.54 cfm.

The unit weighs about 23 pounds, stands 11 $\frac{1}{8}$  inches high, is 9 inches wide, and 6 $\frac{1}{2}$  inches deep. It can be supplied with or without an automatic clutch throwout.

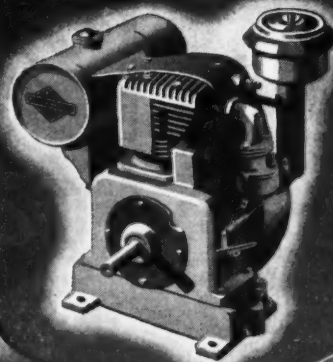
You can obtain full details on this unit by writing the Industrial Division, Westinghouse Air Brake Co., Wilmerding, Pa. Just mention this item.

### New du Pont Engineer

The retirement of Everett G. Ackart, Chief Engineer, has been announced by E. I. du Pont de Nemours & Co., Wilmington, Del. Mr. Ackart, who climaxed his career by supervising the design and construction of more than \$1,000,000,000 worth of war plants, has been with the company almost 40 years.

Granville M. Read, Assistant Chief Engineer since 1943, succeeds Mr. Ackart.

## Equipment Performance Depends on the Engine that Powers It!



that's why

### BRIGGS & STRATTON Engines are "Tops" in Demand

There are over 2 $\frac{1}{2}$  million reasons for today's unprecedented demands for Briggs & Stratton powered equipment. They are the more than 2 $\frac{1}{2}$  million Briggs & Stratton engines built during the past 26 years. These engines have established an unbeatable record for instant starting, long life, dependable operation, and maximum performance with a minimum of servicing. No wonder these stout-hearted, precision-built engines rate "tops" as the power choice of equipment users, dealers and manufacturers everywhere! And here's good news! Deliveries are improving with our stepped-up production. It will pay you to wait until you can have equipment that's powered RIGHT by — Briggs & Stratton air-cooled engines — the world's finest.

**BRIGGS & STRATTON CORPORATION**  
MILWAUKEE 1, WISCONSIN, U. S. A.

*Air-Cooled Power*

**BRIGGS & STRATTON**

GASOLINE  
ENGINES

**GREASE THIS JOINT  
FOUR TIMES DAILY**

### Do You Realize What This Tag Means To Operators of Your Machines?

**D**URING rush seasons, operators resent stopping every few hours to remove safety shields, grease plain bearing universal joints and replace the shields — or risk break-downs if they fail to grease the joints, or accidents if they fail to replace the shields. Most manufacturers provide shields over the joints in their machines. But shields give no protection, when not used. And the operator blames the machine when he loses his pants by taking a chance. His excuse for leaving the shields off usually is the nuisance of frequent lubrication. Keep the odds in your favor by specifying **MECHANICS Roller Bearing UNIVERSAL JOINTS**. They require at most, only once-a-season lubrication. The operator will leave the shields on, because **MECHANICS** joints do not waste his time with frequent stops for lubrication.

**MECHANICS**  
*Roller Bearing*  
**Universal Joints**

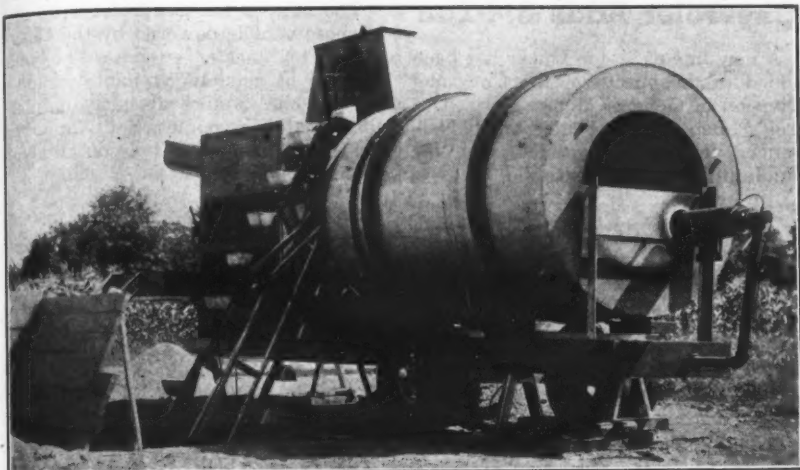


"Lifetime" or Once-a-Season Lubrication Saves  
Up to 10 Percent of the Operators' Time

**MECHANICS UNIVERSAL JOINT DIVISION**

Borg-Warner • 2026 Harrison Ave., Rockford, Ill.





The new Overman asphalt plant is a portable continuous-type unit with a capacity of 20 to 40 tons per hour.

### New Asphalt Plant Is One-Man Operated

Especially adaptable for state and county maintenance work, a portable asphalt plant has been developed by the Komb Drier Co., Marion, Ind., and is now in production. Using SC, MC, or RC asphalt and tars, the plant will handle 20 to 40 tons per hour, Komb says.

Built as a streamlined unit, the plant can be moved by any commercial tractor having a fifth wheel. It is operated by one person, and is complete within its own frame, with the exception of the bin and feeder plates. Weighing 8 tons, the plant is 25 feet long, 7 feet 10 inches wide, and 11 feet 10 inches high.

Aggregate is fed into the front of the special 6 x 10-foot drier from reciprocating feeder plates, one for sand and the other for stone. It passes through the inside cone, returning to the front of the drier, where the elevator picks it up and dumps it into the mixing chamber. Power is supplied by a 45-hp gasoline engine. Burners are located front and back.

Full details of this new Overman asphalt plant can be obtained from the manufacturer on mention of this notice.

### Low-Cost Electrode For Hard-Surfacing

For use where it is desirable to protect ferrous parts with an overlay of more wear-resistant material, a new electrode has been added to the Amsco line of conservation welding products.

Known as Resistwear, the hard-surfacing rod is a low-cost shielded-arc electrode consisting of high carbon, chrome, and molybdenum. It can be deposited on any ferrous base metal, and will produce hardness of 400 to 500 Brinell, Amsco says.

The new rod is available in coated form for ac and dc use in 14-inch lengths having diameters of 1/8, 5/32, 3/16, and 1/4 inch. Straight polarity is recommended for best results.

Full facts about the Resistwear rod

will be sent you by the American Manganese Steel Division of American Brake Shoe Co., Chicago Heights, Ill., if you mention this notice.

### Three New Additions To Dodge Truck Line

Three new heavy-duty trucks, each built in ten different models, have been announced by the Dodge Division of Chrysler Corp. The units are a 2 1/2-ton truck rated at 18,500 pounds, a 3-ton model rated at 21,000 pounds, and a 3-ton heavy, rated at 23,000 pounds.

The thirty models are available in 60 gross-vehicle-weight classifications ranging up to 23,000 pounds, and in tractor-trailer ratings up to 40,000. The 2 1/2-ton has five wheelbase sizes, from 136 to 235 inches. The other two trucks have wheelbases ranging from 136 to 196 inches.

The 2 1/2-ton line uses a 6-cylinder engine having a compression ratio of 6 1/2 to 1 and capable of developing 115 hp at 3,200 rpm and 225 pound-feet of torque at 1,200 rpm. The 3-tonners use a 6-cylinder engine developing 128 hp at 3,000 rpm and 270 pound-feet of torque at 1,200 rpm.

A chrome nickel-molybdenum cast-

iron block, aluminum-alloy pistons, a crankshaft that has nine counterweights and is supported by seven multiple-layer bearings, sodium-cooled, Stellite-faced valves, and a new type of manifold are featured in the engine. An entirely new carburetor system has a downdraft carburetor that incorporates a governor and fuel filter, both integral.

There are many other features in this new line of trucks, Dodge says. The firm will be glad to tell you about them if you write and mention this report. Address the Dodge Division, Detroit 31, Mich.

### Industrial Tractors

Industrial tractors in three sizes are shown by the Minneapolis-Moline Power Implement Co., Minneapolis 1, Minn., in a leaflet, Form T-1,000. The units have a wide range of applications. They have speeds from 2 to 18 mph, 22 to 64 brake horsepower. Write the firm for the leaflet and mention CONTRACTORS AND ENGINEERS MONTHLY.



MICHIGAN MODEL TMDT-16 — 1/2 yd. shovel, 10-ton crane. Equipped with Timken Tandem dual drive axle. Total reduction in low gear 72.88-1. Four Timken-Westinghouse air brakes.

*with* **MICHIGAN**

You'll be 'way ahead when schedules are tough and competition is tougher. You can cut cost-per-job, clean up even the tough ones faster with MICHIGAN Mobile SHOVEL-CRANE. Its truck mobility saves valuable time when traveling from job to job and permits easier, quicker movement on the job. Smooth-as-silk finger tip air controls plus

dependable, economical power give you that fast, steady performance that counts . . .

Plan now to put MICHIGANS on your jobs! There's a complete line of 3/8 yard and 1/2 yard shovels, 6 to 12 ton cranes — all fully convertible, all one-man operated. Get the facts — ask for Bulletin CE-116.

**HOISTS  
DERRICKS  
WINCHES**

A Complete Line of Builders' Derricks and Winches—nationally known for dependable service and long life.

Write for Catalog or send your problems to our Engineering Department

The Sasgen line is handled by leading equipment distributors everywhere.

**SASGEN DERRICK COMPANY**  
3101-27 W. Grand Avenue, Chicago 22, Ill.

**MICHIGAN**

**POWER SHOVEL COMPANY**

BENTON HARBOR, MICHIGAN



## Overpass Eliminates Curves at Crossing

**State Initiates Program to Replace Old, Dangerous Structures at RR Crossings: One Typical Project**

† A LONG-RANGE program designed to eliminate narrow, blind curves at railroad underpasses has been undertaken by the Kentucky Department of Highways. Typical of the new overhead structures which will more adequately meet the demands of modern traffic is a 281-foot overhead on the Bowling Green-Franklin Road, at the L & N main-line tracks about 5 miles south of Bowling Green. Work on the new overhead was completed this season.

Early last spring, the Kentucky Department of Highways issued a work order to the contractor, Lyons & Breeden, Rogersville, Tenn., to start construction on this \$70,470 project. Jack Willard of Bowling Green, Superintendent for the contractor, moved on the job site with a Caterpillar D4 and Traxcavator and a Caterpillar D6 bulldozer and started moving the 1,930 cubic yards of dirt and rock for the six piers and two abutments.

The common excavation for the 6 x 19-foot and 6 x 18-foot abutments and the 6 x 9-foot piers was handled by the Traxcavator and the dozer. Footings for the overpass rest on bedrock at a depth of about 15 feet. When the rock was encountered, 1-inch holes were sunk by drills powered by a Worthington Blue Brute compressor. About 1,200 pounds of explosives were used in shooting the 280 cubic yards of rock.

Rock was removed from the excavation by a Buckeye crane. All but the larger rock was hand-loaded to the ¾-yard bucket by workmen in the trenches. The larger rocks which could not be handled easily were snaked out by the Caterpillar D6.

Shoring for the piers was driven by the Buckeye crane, and the excavations were unwatered with four 3-inch and one 2-inch Jaeger pump. A Johnson ½-yard batching plant and a Jaeger mixer furnished the 1,168 cubic yards of Class A concrete and 247 cubic yards of Class D concrete included in the 7-span overpass. Concrete was poured in the forms by the Buckeye using a ¾-yard bucket.

Employing 12 men on a 10-hour shift 6 days a week, the contractor required approximately 6 months to complete the work. Indicative of its progress, No. 2 abutment, with footings which measure 6 x 19 x 3 feet, required 1½ days for excavation and 3 days for setting forms and pouring concrete.

The new overpass has an overall length of 281 feet. The concrete floor is 26 feet wide, flanked by curb and handrails. The seven spans include four 40-foot spans, two 28-foot spans, and one 50-foot span. Pier footings are 6 x 9 feet on each of three legs; abutment footings measure 6 x 19 and 6 x 18 feet. Columns are 3 feet square.

The new overpass, with highway reconstruction and approaches to be built soon, will eliminate the blind underpass at the L & N tracks; it will also slightly reduce mileage on the Bowling Green-Franklin Road.

### Personnel

Personnel on the project included C. E. Davis of Bowling Green, Resident Engineer for the Kentucky Department of Highways, and Jack Willard, of Madisonville, Ky., Superintendent for Lyons & Breeden, the contractor.

### New Wire-Rope Clip Has a Fist-Like Grip

A wire-rope clip claimed not to crush, distort, break, or waste rope has been devised by the Thomas Laughlin Co. Called the Safety Fist-Grip, the new line of clips makes use of flat bearing surfaces to grip the rope in a fist-like hold.

The nuts on this clip are out in the open on opposite sides. This saves trouble when tightening, and eliminates the possibility of putting the clip on backwards, Laughlin says. Fewer clips are deemed necessary to do the job.

Laughlin will be glad to send you literature describing and illustrating the advantages of the new Safety Fist-Grip wire-rope clip. Write the firm at Portland 6, Maine, and mention this news item.

### Jack Thorp Joins Marvel

A former Army Air Force officer, Jack N. Thorp has joined the sales staff of the Marvel Equipment Co., Chicago, Ill. From 50 Church St., New York City, Mr. Thorp will supervise eastern sales as far west as Buffalo.

## Chevrolet Adds 3/4-Ton

A new line of ¾-ton trucks has been added to the output of the Chevrolet Division of General Motors Corp., Detroit, Mich. It embodies many advanced features, Chevrolet says, including full-floating rear axle.

The new ¾-ton Chevrolet is an all-purpose vehicle powered by the Chevrolet Thriftmaster engine. The wide variety of models available includes chassis, chassis and cab, pick-up, platform, and stake bodies. Your Chevrolet dealer will be glad to tell you all about them.



—Gives same strength as plain concrete in half the time.

—Permits form removal on fast summer schedules.

—Allows much speedier placing of succeeding courses.

—Supplies "built-in" curing.

Use calcium chloride in all concreting when temperature is likely to drop below 50°.

Get our booklet, "Early Strength Concrete," on methods.

CALCIUM CHLORIDE ASSOCIATION • LaSalle Bldg., 1028 Connecticut Ave., Washington 6, D. C.

**Better Concrete - Faster**  
with **CALCIUM CHLORIDE**

**Speedway**

No. 69 ¼" Drill \$17.80

No. 89 ½" Drill \$29.95

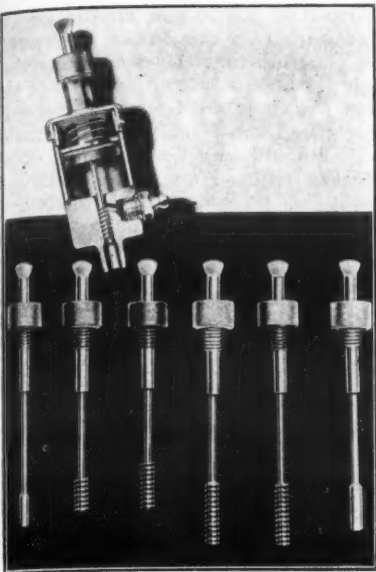
Each month, more Speedway Drills come off the production line; are being shipped each day. But, frankly, though we are beginning to cut into our mountainous pile of back orders, there's a deal of waiting still for a lot of people who are ordering Speedway Tools today. However, because they are worth waiting for, we suggest that you place your order now with your local Speedway dealer for earliest possible delivery.

**SPEEDWAY MFG. CO.**  
1834 S. 52nd Ave., Cicero 50, Ill.  
No. 89 equipped with Snap-Release Chuck

No. 89-J with Jacob chuck (as illustrated) \$5.00 extra

**TRINIDAD  
NATIVE LAKE  
ASPHALT**  
BARBER ASPHALT CORPORATION  
BARBER, NEW JERSEY





The Gun-Fil bearing lubricator, with its set of six different valves, provides a measured uniform flow of lubricant to a moving bearing.

### Bearing Lubricator With Feed Control

Gray Co., Inc., maker of the Graco Convoy Luber for lubricating construction and maintenance machinery, has acquired the manufacturing rights to Gun-Fil bearing lubricators. Gray is now manufacturing the lubricators in four sizes, in capacities that range from 1/2 to 8 ounces.

Controlled lubrication over a long period of time is assured by the Gun-Fil, the manufacturer says, since the device feeds only the precise amount of lubricant needed by each individual bearing. Filled by pressure, it dispenses oil or grease in a measured, uniform flow to a moving bearing; it stops its lubricating action when the bearing is stilled. This extends the time between refilling and saves labor, Gray says.

Six different valves, each interchangeable with the others, provide for varied degrees of feed control when greases of different densities are being used. The valves have caps that are distinctively colored for identification.

You can secure full details about Gun-Fil and other lubricating equipment by writing Gray Co., Inc., 60 Eleventh Ave., N. E., Minneapolis 13, Minn. Tell the firm you saw this notice.

### AC Engine Generators

A new series of ac generators, designed for direct connection to 720 and 900-rpm engines, has been added to the line produced by the Kato Engineering Co., Mankato, Minn. The series is made in both 8 and 10 poles.

The alternator in the new Kato units can be furnished with either two bearings or a single bearing. The frame is steel, and the ball bearings are the cartridge type. Generators for 900-rpm engines are available with a direct-connected or a top-mounted exciter. The smaller model has only a top-mounted V-belt-driven exciter. All exciters are shunt-wound and can be furnished at either 125 or 250 volts dc.

Low loss and high efficiency are said to mark the stator, built of 26-gage core-plate-steel laminations. Heavy insulation is found on the slots and the form-wound coils. Stators and rotors are preheated, dipped, and baked in an electrical insulating varnish to fill interstices as an insurance against acid, oil, and moisture.

Parallel operation of two or more units is possible because of their amortisseur windings. The generators are available in 2 and 3-wire single-phase, and 3 and 4-wire three-phase for voltage combinations.

Complete data on these new generators can be secured from the Kato Engineering Co. Merely mention this report when writing to the firm.

### Variety of Power Units

Power units for many purposes are shown by the International Harvester Co. in a 16-page catalog available to readers of CONTRACTORS AND ENGINEERS MONTHLY on request. The catalog features four carburetor-type units equipped for gasoline, natural gas, or distillate fuel, as well as four diesel models, in sizes up to 125 hp.

Write International Harvester for Catalog A-293-JJ, and mention this notice. The firm is located at 180 No. Michigan Ave., Chicago 1, Ill.

### C. S. & S. Buys Kelly Steel

One of Chicago's oldest steel-fabricating houses, Kelly Steel Works, was recently acquired by The Commercial Shearing & Stamping Co., Youngstown, Ohio. Kelly has been a large producer of forging, welding, and structural steel for tunnel supports and other work. Commercial manufactures hydraulic hoist equipment and pressed metal

products. It is expected that Kelly Steel will be expanded and operated by Commercial as a wholly-owned subsidiary.

### Paints Over Rust

Painting over rust without cleaning or scraping is said to be possible with a new type of industrial paint introduced by Speco, Inc. Known as Rustrem,

the new product is said to seal the rusty surface, stopping corrosion permanently. It is designed to be applicable on metals which will be submerged in water or exposed to moist or fume-laden atmosphere.

Further details on this new paint will be sent to you upon request. Just mention this notice when writing Speco, Inc., 3142 Superior Ave., Cleveland, Ohio.

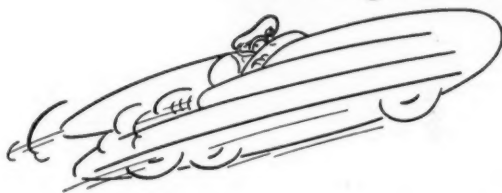
**SPEED OPERATION for Snow Plows and Road Machinery with the . . .**

**MONARCH New and Improved HY-LO-JACK**  
Fan Belt Driven  
**Power Hydraulic Control**

Lifts plows ten times faster than hand pump. Cab-controlled. Easy installation on new or existing equipment. Priced for the most conservative budget.

WRITE FOR CIRCULAR H-75  
**MONARCH ROAD MACHINERY COMPANY, 327-329 Front Ave., N.W., Grand Rapids 4, Michigan**

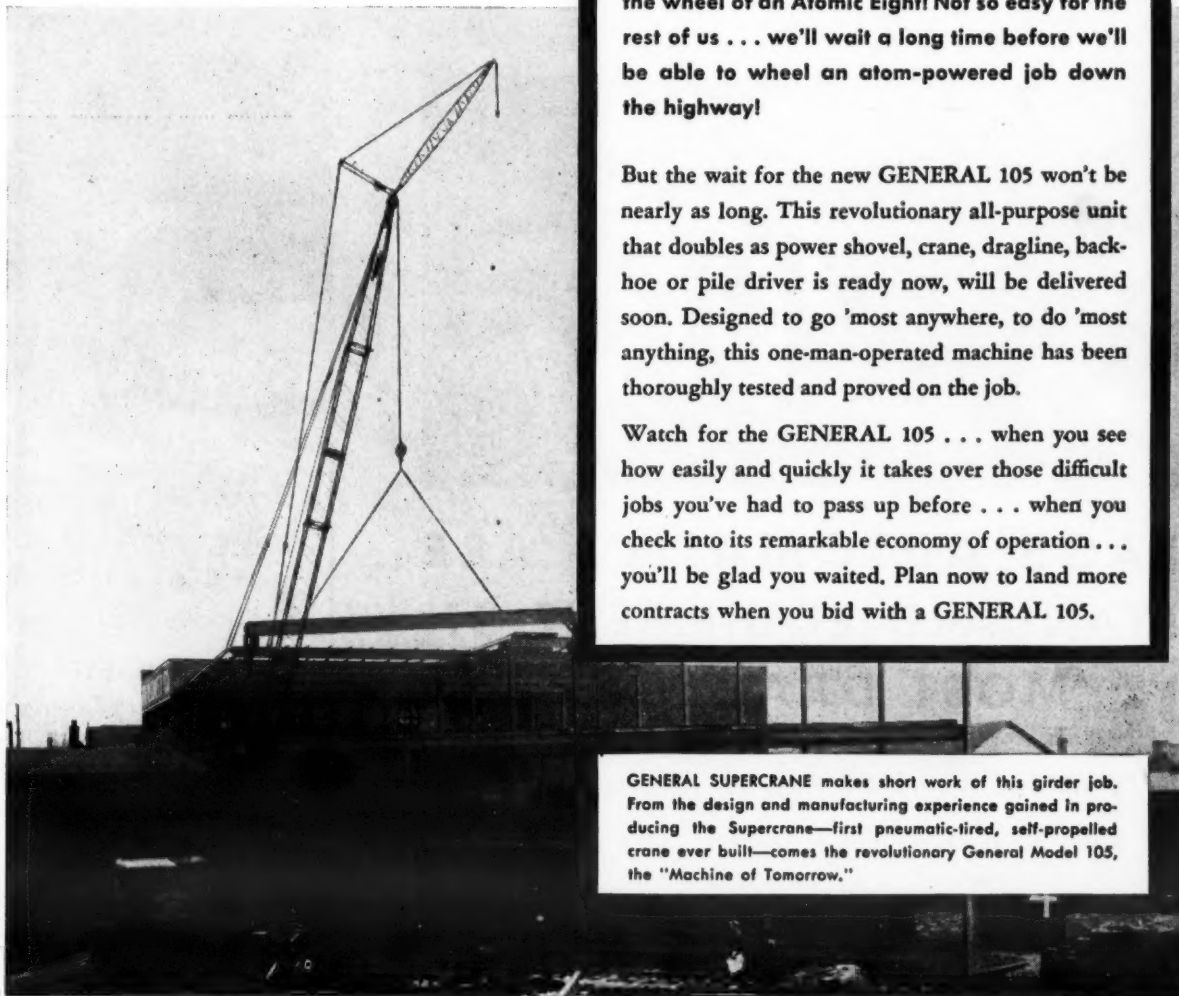
## The General Has Everything . . . Including an Atom-Powered Automobile!



The genial old "General" is always the first to acquire these "postwar wonders" . . . a word to the artist and there's the old boy, sitting behind the wheel of an Atomic Eight! Not so easy for the rest of us . . . we'll wait a long time before we'll be able to wheel an atom-powered job down the highway!

But the wait for the new GENERAL 105 won't be nearly as long. This revolutionary all-purpose unit that doubles as power shovel, crane, dragline, backhoe or pile driver is ready now, will be delivered soon. Designed to go 'most anywhere, to do 'most anything, this one-man-operated machine has been thoroughly tested and proved on the job.

Watch for the GENERAL 105 . . . when you see how easily and quickly it takes over those difficult jobs you've had to pass up before . . . when you check into its remarkable economy of operation . . . you'll be glad you waited. Plan now to land more contracts when you bid with a GENERAL 105.



GENERAL SUPERCRAANE makes short work of this girder job. From the design and manufacturing experience gained in producing the Supercrane—first pneumatic-tired, self-propelled crane ever built—comes the revolutionary General Model 105, the "Machine of Tomorrow."

THE GENERAL 105 • ONE-MAN OPERATED • ONE-ENGINE POWERED • MOUNTED ON RUBBER  
WATCH FOR IT!

THE  
**OSGOOD**  
COMPANY  
SHOVELS, DRAGLINES  
CRANES  
CRAWLER & WHEEL MOUNTS  
DIESEL, OIL, GAS, ELECTRIC

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**GENERAL**  
EXCAVATOR CO.  
MARION, OHIO

**GENERAL**  
CRANES, DRAGLINES  
AND SHOVELS  
DIESEL, GAS, ELECTRIC



# Cascade Dam

(Continued from page 1)

and if necessary it may install a company-operated mess hall. It is getting a much more serious-minded type of construction stiff than it did ten years ago, and these lads have quietly fought an undeclared war with the profiteers, forcing eight of the fourteen "joints" out of business in about a month. Their war, incidentally, is not company-sponsored.

Cascade Dam is scheduled for completion two years from June 3, 1946. The construction season at Cascade is only nine months long. Work during December, January, and February is well-nigh impossible. Heavy equipment will be overhauled then, and if he can erect a big enough carpenter shop Oberg hopes to build some of the intricate formwork in the outlet structure and spillway this winter.

The work program this year calls for completing the 12-foot-ID tunnel tube for the river outlet, erecting an earth cofferdam to divert the river through this tube, stripping overburden from the dam in the cofferdam area, and pouring a reinforced-concrete cut-off wall. This wall will key the impervious clay core to granite bedrock under the dam. Line drilling and grouting of bedrock faults may also be done this year.

Work is already under way on two of the toughest parts of the job: the excavation of the spillway cut through the right abutment, and the driving of the outlet-tunnel tube to carry a normal summer flow of 600 cubic feet per second under the spillway. Peak flows on



C. & E. M. Photo

Drillers get ready for a big shot in the spillway at Cascade Dam, while a Northwest 80-D deposits a big rock in one of the feet of end-dump Euclids used to remove spillway excavation.

the Payette River's north fork run about 8,000 cfs when spring snows melt. The dam, with a crest elevation of 4,840, lacks just over 400 feet of being a mile above sea level.

## Spillway Excavation in Rock

In order to use up as much of the initial bad stripping as possible, Oberg started digging the spillway cut immediately. Dirt, sand, badly decomposed granite, and organic matter are being used to build haul roads. As excavated material improves, it will be stockpiled for use in the pervious zones of the structure. When the work gets down deep into solid granite, rock will be stockpiled for use as riprap.

On account of very deep cuts in the

spillway, excavation is going down in

three lifts, and 20-foot Timken steel is being used on the drilling equipment. A Worthington 500-cfm compressor and an Ingersoll-Rand machine of the same capacity are furnishing power to three Ingersoll-Rand wagon drills, and, intermittently, to nine Ingersoll-Rand Jackhammers. Later, two stationary 1,500-cfm machines will be hooked to the air headers that go to the dam. They will operate a drilling jumbo and do pressure grouting.

Wagon drills and Jackhammers are fitted with Timken detachable rock bits on Timken steel. Holes are started with new 2½-inch bits, decreasing in size as they go deeper. A bit will drill from 2 to 3 feet in seamed granite, then lose its gage and dull. Bits are being re-sharpened about eight times before they are discarded. In badly seamed rock, 14-foot steel works better than the 20-foot length.

On account of bad seams, the explosive ratio is 1¼ pounds of powder to the cubic yard. Du Pont 40 per cent gela-

(Concluded on next page)



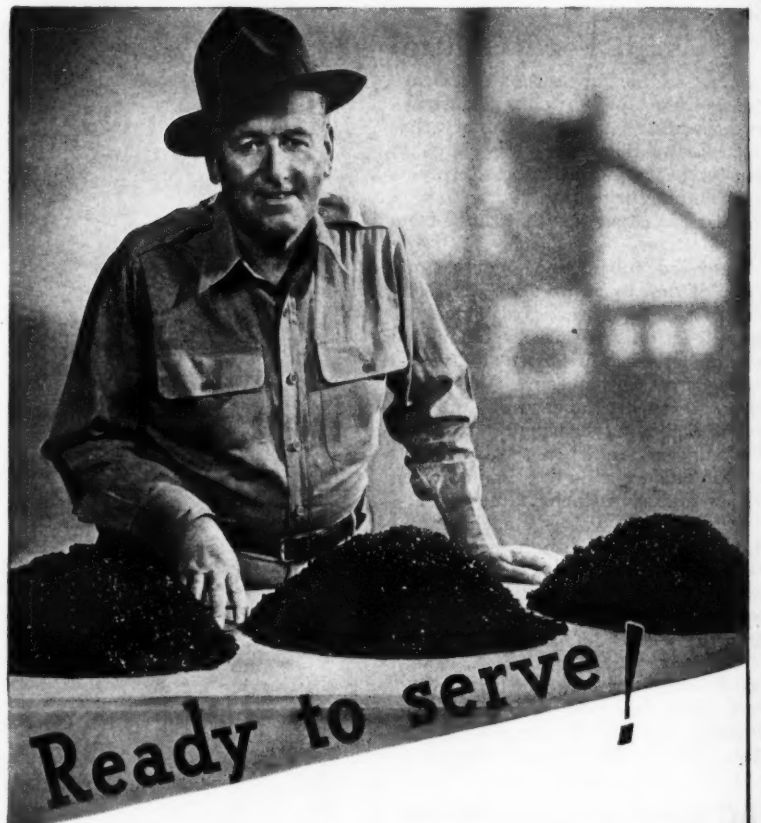
## PAGE AUTOMATICS ARE STANDARD EQUIPMENT ON MOST DRAGLINES

THE Page AUTOMATIC is the only dragline bucket that will automatically land in a ready-to-dig position and hold this position with all lines slack. The instant the load line is pulled the AUTOMATIC will dig right in and come up with a full load within one or two bucket lengths. Therefore time is saved and yardage is increased.



Catalog number 468  
sent upon request

**PAGE** ENGINEERING COMPANY  
CHICAGO 38, ILLINOIS



You can't pass road mixes across the counter like sugar or salt, but certain unique features of KOTAL MASTER MIXES make it possible to handle them almost as easily as that.

KOTAL MASTER MIXES can be stockpiled ready for delivery in any quantity at any time, regardless of season or weather. That's a great convenience and a saving for plant, contractor and customer. Only the KOTAL Process makes this possible.

Let us tell you more about this important scientific development in the art of road building and maintenance. We'll gladly send free booklet to you—also the name of your nearest supplier.



**KOTAL COMPANY**  
360 Springfield Ave. ★ Summit, N. J.

**KOTAL Master Mixes**  
The Advanced All-Weather Aid in Building Better Roads



# Cascade Dam

(Continued from preceding page)

tin is being used. Blasted rock and dirt are being loaded by a Northwest 80-D shovel to eight Euclid end-dump trucks, each hauling 10 cubic yards. Excavation output in the spillway for this equipment has averaged 100 cubic yards an hour for all three shifts in the first month of the job.

Spillway excavation opened part of the tunnel inlet portal. The outlet end of the tube, where drilling began, was faced off at the same time. A Northwest Model 25 shovel was used for part of this work, and for assembling drilling and tunnel-mucking equipment. Two Caterpillar D8's with LeTourneau bulldozer blades are being used around the rock for cleaning up, and for moving the wagon drills.

## Tunnel Mucking

Driving of the 12-foot-diameter outlet tunnel got under way late in July, and was finished in about 30 days. Al Huntington was sent to Cascade Dam as Superintendent of Tunnel Construction. The tube is 375 feet long, drilled through solid granite under the spillway. It will be lined with Class A concrete. When the river starts through this tube, M-K will divert enough flow to supply a 6-foot-diameter penstock tube operated by the Idaho Power & Light Co. The company's 300-kilowatt generators have to function continuously; that is one of the contract provisions.

A narrow-gauge railroad carried mucked tunnel rock off to a storage area below the dam, near the site of the present diversion structure built above the Idaho Power & Light Co. powerhouse. When the lower portal was squared off, a shop-made drilling jumbo with five drift drills moved in with 6-foot steel. Some 14 holes were drilled in the tunnel face and loaded with 40 per cent powder at the rate of 1 1/4 pounds per cubic yard. Instantaneous caps were used in the center of the bore with delays towards the wall lines. The tunnel invert rises on a slope of 0.373 from the outlet portal, and its alignment is straight.

When the tunnel receives its concrete and structural-steel lining, and the river is diverted, a strip 180 feet



C. & E. M. Photo

A narrow-gauge railroad and tunnel-mucking machinery are set up for diversion-tunnel work at the site of Cascade Dam in Idaho.

wide can then be cleaned off to bed-rock within the dirt cofferdam, and work on the concrete core wall will

begin. The placing of four zones of rolled earth will be on the agenda for 1947, and will in all likelihood be de-

scribed in detail at that time by CONTRACTORS AND ENGINEERS MONTHLY.

## Personnel

Earl Harmon is the Resident Engineer on the job for the U. S. Bureau of Reclamation. In addition to Project Superintendent Gus Oberg and Al Huntington, Tunnel Superintendent, Morrison-Knudsen Co., Inc., is represented by Assistant Superintendent R. J. Jones, by Master Mechanic Virgil Norwood, and by Purchasing Agent Rex Chaffin.

## Tri-Dimensional Drawing

You can now plot your designs and drawings in tri-dimensional representations, the Pomeroy Stereograph Co. says in a bulletin on its stereograph drawing machine. The 4-page bulletin details the theory and use of the machine, and can be obtained for the asking. Write Pomeroy at 1783 E. 11th St., Cleveland 14, Ohio, and mention this review.

Behind the symbol "Butler Engineered Design" stands an enviable background of nearly a quarter of a century,—not only of engineering and manufacturing experience, but of pioneering in many of the major equipment developments for

## Background of a Symbol

the concrete construction industry . . . Twenty years ago, Butler pioneered and has since led in the design of Ready Mixed Concrete Plants,—just as, more recently, Butler pioneered the construction of the modern Concrete Block Plant. The Butler Carscoop is a notable example of Butler pioneering and development in modern materials handling. Go to the pioneer for ingenuity and the engineering knowledge that only wide experience can bring.

BUTLER BIN COMPANY

W A U K E S H A W I S C O N S I N



*It's Stormproof!*

Order through Your Jobber  
EMBURY MFG. CO., WARSAW, N. Y.





# Special Tools Speed Road-Widening Project

## Attachments on Grader Moldboards Cut Extension Trenches and Roll Asphalt Paving on 6-Mile Job

† THE first contractor who improvised a special tool for a difficult problem is resting in a special heaven for construction men, no doubt, his pockets lined with long green bills. The precedent this unknown and unsung builder left behind is still in vogue in the construction industry, and wherever you find it you usually find fast and profitable work.

On U.S. 69 just north of Fort Scott, Kans., the Bowen-Shaw Paving Co. of Kansas City, Mo., has given this old practice an unusual new twist. It made and used special tools to widen the existing 16 and 18-foot slab to 20 feet. Bowen-Shaw's \$180,000 subcontract with A. F. Reis of Topeka, prime contractor for the State Highway Commission of Kansas, called for narrow slab extensions only 12 inches wide on both sides of the old 18-foot pavement north from Fort Scott.

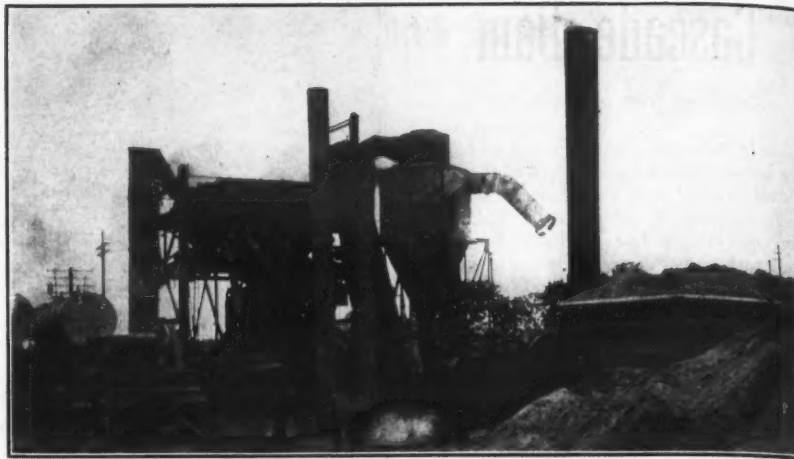
The narrow trench, 15 inches wide at the bottom and 8 inches deep, was dug along the pavement by a Caterpillar No. 12 motor grader. The special tool for this operation consisted of a piece of old motor-grader moldboard 21 inches wide, fastened to the Caterpillar blade with four ¾-inch steel bolts. It was placed midway on the 12-foot blade, and so located that earth from this special blade would be swept aside on the shoulder of the highway by the normal cutting edge. The special tool was set 8 inches in the clear below the cutting edge of the main blade. It rooted up nests of boulders almost as easily as it sliced through dark blue Kansas gumbo, and it stayed well ahead of the filling crew.

Another special tool was a 12-inch smooth steel wheel taken off the Cedarapids asphalt-batching plant and bolted to the moldboard of an Allis-Chalmers Model AD motor grader. Three sets of two ⅝-inch steel bolts were used here, leading through ½-inch steel-plate stock. The rolling wheel was

set 3 feet in the clear of the end of the blade. The potential down-pressure leverage on this wheel was great enough to lift the front end of the Allis-Chalmers machine off the ground. This innovation was used to compact the bottom of the extension trench, and for certain other compaction work which will be described in detail later. The wheel could be removed in 15 minutes in case the Allis-Chalmers grader was needed for shoulder dressing.

### Pavement Widening

Work began on August 2, 1946, with a 100-working-day time stipulation in the contract. Some 7.107 miles in Bourbon County had already been widened, so this section required no attention. Of immediate importance was 6.121 miles



C. & E. M. Photo  
Bowen-Shaw set up this Cedarapids asphalt plant, served by a railroad spur line, to batch asphaltic-concrete surfacing for the Fort Scott job.

of 18-foot road, paved with red brick and asphalt, located just north of Fort Scott.

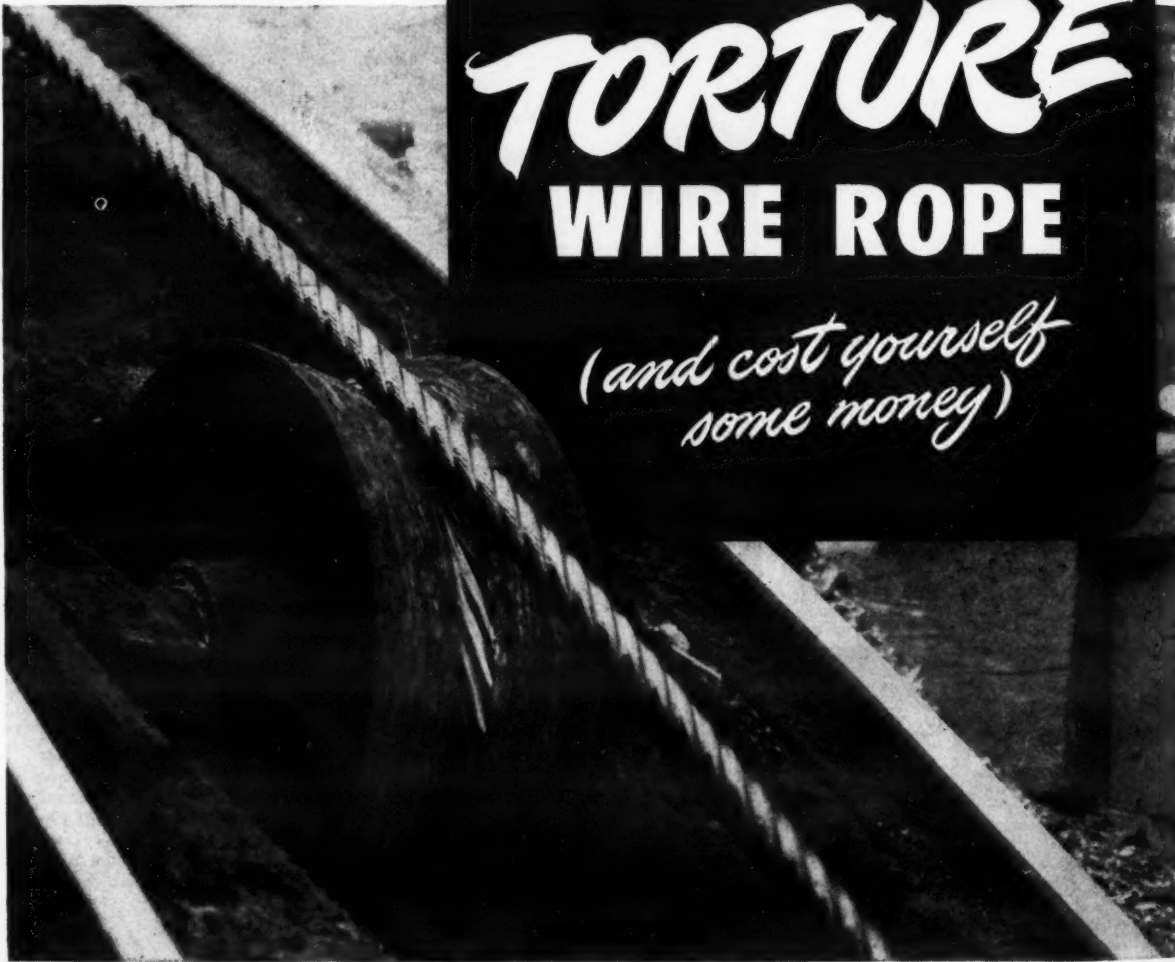
The Caterpillar No. 12 motor grader,

with the special trench-digging tool, excavated a trench section 8 inches deep and 15 inches wide along both edges

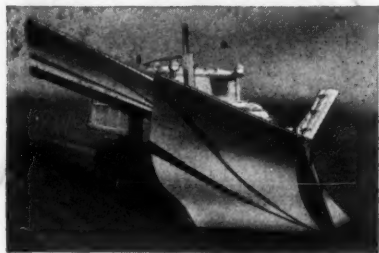
(Continued on next page)

## HOW TO TORTURE WIRE ROPE

*(and cost yourself some money)*



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**The BURCH Corp.**  
Crestline, Ohio

Here's a track roller on a mine slope that's badly in need of replacing—because of the harm it can do to valuable wire rope. The same condition often exists on sheaves and drums.

See the deep corrugations with the sharp ridges that have been worn in the groove—worn, more or less, to the pattern of the rope lay. Now, as you see them, they're sharp — irregular — jagged. They can cut, nick, and abrade as the

rope passes over them. When the present rope is replaced, the new one can suffer real damage in the initial days of service, and this rope abuse will continue as long as the worn roller is kept in use.

So take our tip—don't run your costly wire rope over abnormally-worn equipment. It's false economy, any way you figure it.

At your request, made through your wire-rope distributor, a Bethlehem engineer will be glad to

inspect your rollers, sheaves, or drums for size and wear. Often, he can spot and eliminate trouble while it's still easily cured.



When you think WIRE ROPE

... think BETHLEHEM





C. & E. M. Photo  
Hot-mix material for the 6-mile pavement widening near Fort Scott, Kansas, was dumped from the trucks into this shop-made spreader hopper.

## Special Tools Speed Road-Widening Project

(Continued from preceding page)

of the old pavement. All work in this connection was performed mechanically, and excavated dirt and rock was bladed off about 5 feet from the edge of pavement on the graded shoulder. Excellent footing was obtained because the motor grader had one set of wheels on the existing pavement all the time it was in its digging position. Shoulder conditions were also favorable.

The bottom of the trench was then rolled by six passes with the Allis-Chalmers specially equipped grader. Trucks from the asphalt plant hauled lead-mine-chat aggregate for a 2-inch insulating course. This was the same material the contractor normally used as a mineral filler for bituminous topping. It was dumped by the trucks into another special job tool—a sheet-iron spreader box 4½ feet long, 9 feet wide, and 18 inches in height. This all-welded box had a sloping bottom, and material dumped in would naturally gravitate towards the feeder which was located directly over the trench. A dump man with a shovel helped. Two towing chains on each corner of this spreader box were hooked to the end gate of each truck as it backed into position. The dump trucks were used as motive power for towing the spreader along the trench.

The 2-inch chat insulating course was leveled by one man who followed the spreader box. He used a small rake, similar to that used by an asphalt raker. The Allis-Chalmers motor grader equipped with the special roller followed closely behind the gravel spreader, rolling this blanket to about 90 per cent of its ultimate compaction.

Four Chevrolet and International dump trucks then hauled hot-mix bituminous material for a 3-inch binder course, and dumped it in the spreader box. It was raked down at a temperature of 300 degrees and compacted by repeated rollings of the Allis-Chalmers grader. The second course of 3-inch asphaltic concrete was laid in the same manner, but was accessible for rolling by a 10-ton tandem Buffalo-Springfield smooth roller.

On a 3.676-mile section of 16-foot road near the north end of the contract, the excavation and insulating course were taken care of in the same manner as that already outlined. But the rolling of the first lift of black-top was done by a 3-wheel smooth roller mounted on a Fordson tractor. Greater widths of widening made this possible.

"In any case, we would normally have assigned two motor graders to the job for shoulder dressing and general grading," Matt Bowen, the contractor, explained. "The use of these special tools on motor graders simply took full advantage of their normal time."

### Surfacing Material

The batching of asphaltic-concrete surfacing was the only cause of work slowdown on the job. Mineral aggregate had been arranged through a lead-zinc chat source near Baxter Springs, Kans. Although tens of thousands of tons of this material was available, the shortage of railroad cars caused enough delay in shipments to affect the job adversely. The project was nearly a month along before any arrangements could be made to speed up deliveries.

Liquid asphalt was shipped in insulated cars from southern Kansas, and required about 4 days for the trip. Because of this lengthy shipping time, all the cars had to be preheated at the plant before they could be unloaded. This was done by a 100-hp Kewanee boiler. The Cedarapids asphalt plant owned by Bowen-Shaw was set up in Fulton, Kans., on the SLSF railroad. It was served by a spur line which delivered the cars of aggregate and asphalt. A Northwest 1-yard clamshell unloaded

(Continued on next page)

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Good for all Small Jobs



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## Special Tools Speed Road-Widening Project

(Continued from preceding page)

aggregate and fed the Cedarapids plant bins.

Specifications for mineral filler called for the chat to meet these sieve sizes:

Sieve Size	Binder-Course Material Kansas Mix No. HM-3	Per Cent Retained
3/4-inch		0
No. 8		35-65
No. 30		65-80
No. 200		90-95
AC-5 asphaltic cement 6 1/2 per cent by weight		

Sieve Size	Sheet-Asphalt Surfacing Kansas Mix No. HM-7	Per Cent Retained
3/4-inch		0
No. 8		30-60
No. 30		65-80
No. 200		85-88
AC-5 asphaltic cement 7 1/2 per cent by weight		

Laboratory tests were run several times a day on all aggregates coming to the project. The Kansas State Highway Commission requires inspections and tests of asphalt and similar materials, and a copy of the results of these tests was always available on the job. Asphaltic cement had a penetration factor of 85 to 100, and tested about 92.

### Laying the New Surface

Before the hot-mix paving started, the surface of the old highway was primed with 0.1 gallon of RC-1 cut-back asphalt per square yard, applied by a pressure distributor, at a temperature of 175 degrees. This prime was applied only 10 feet wide, leaving the other lane open to a traffic count of 1,500 vehicles per day.

Four 3,000-pound batches from the Cedarapids asphalt plant were hauled in each truckload. Binder-course material was first laid down by dumping the trucks to a Barber-Greene bituminous finisher, and spreading this mixture about 1 1/4 inches thick. A Galion 8-ton tandem roller compacted this leveling course to a finished thickness of an inch. Matt Bowen experienced no difficulty in laying this leveling course on the irregular surface of old brick, asphalt, and two existing concrete widening strips. The Barber-Greene machine adjusted its thickness as necessary, and laid the leveling course to a true top plane.



C. & E. M. Photo

One of several special tools on the job was this 12-inch smooth steel wheel, which was bolted to the moldboard of an Allis-Chalmers Model AD motor grader and used to compact the bottom of the extension trenches.

The job was so set up that binder-course material 10 feet wide was run the first day. The second day the same material was run on the other half of

the pavement. Performance figures on this 1-inch binder course averaged a mile per shift on a 10-hour continuous run.

On the third day, the first day's run was covered by a wearing course of sheet-asphalt surfacing 2 inches thick, which rolled down to 1 1/2 inches finished. The fourth day finished a work section of the highway. Since the footage averaged slightly less on the thicker wearing surface, it was necessary at times to run surfacing several successive days in order to balance the two work sections. The center joint was tapered. When the adjacent strip was placed, the joint was rolled first to bond it as tightly as possible before the asphalt cooled.

Average hauls were about 8 miles from the batch plant to the finisher, with a 10-mile maximum. Since the weather was warm in Kansas at that time of year, it was not necessary to cover the batch trucks.

### Maintenance of Equipment

One of the secrets of the continuous performance of Bowen-Shaw's equipment over a period of ten years has

(Concluded on next page)

## AN UNUSUAL WATERPROOFING PROBLEM:

# Holding Back a 4<sup>ft.</sup> High Tide IN AN ELEVATOR PIT!

### The PROBLEM:

To control water seepage in the elevator pit of the Barnum Garage, Bridgeport, Conn. Located directly over an old river bed, the pit daily filled with water up to four feet when the tide came in. Continual seepage caused

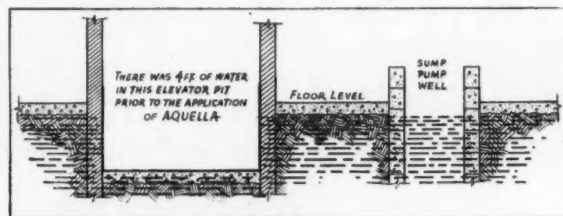
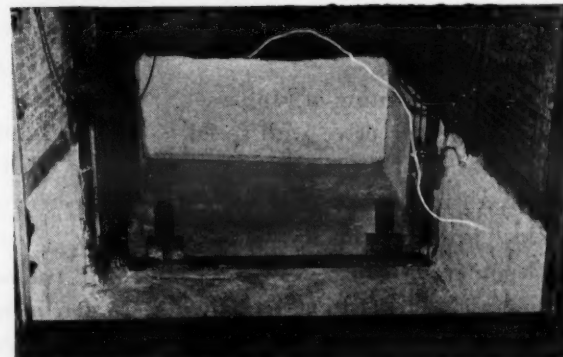


Diagram illustrating the problem.

cables and mechanism to rust; breakdowns were frequent. After so-called "waterproofing paints" were proven ineffective, a three-foot-in-diameter sump pump well was installed with an oversized pump, having a two-inch main. The pump worked constantly; literally it was pumping a river. But even this did not work, because of mechanical and electrical failures.

### The SOLUTION:

The application of AQUELLA



The elevator pit after it was treated with Aquella in January, 1945. According to L. Levitt, garage operator, it hasn't leaked since it was Aquellized 20 months ago.

### The RESULT:

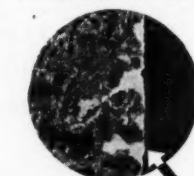
As Mr. L. Levitt, operator of the garage, describes it: "Since January 1945, when the elevator pit was Aquellized, we have had the sump pump disconnected—even though the water in the sump pump well rises up to the cellar floor level. This proves that the floor and walls of the pit are surrounded by water held back by Aquella."

### The REASON

for Aquella's effectiveness in holding back a 4-ft. high tide in this elevator pit centers around the entirely new principle on which it works...a principle that distinguishes it in three ways from the so-called "waterproofing paints." First, the ingredients of which Aquella is composed are so finely ground that they penetrate the masonry intensely to fill and close the most microscopic pores. Second, Aquella is scrubbed into the face of the masonry—not just "brushed on" to coat the outside surface. Third, Aquella has an exclusive chemical property which causes it to expand and set up a harder, firmer bond when water contacts it.



The sump pump well is no longer used. Pump was disconnected months ago. Water still rises to the floor level as can be seen in the above photograph—proving that the floor and walls of the pit are still surrounded by water held back by Aquella.



Photographic enlargement of a small, sawed-away section of a concrete masonry unit showing the way Aquella penetrates to fill and close the pores of the surface.

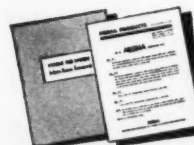
As it cures, Aquella leaves a beautiful white finish that does not powder, peel, flake or rub off, and can be painted over with any color.

**Specify AQUELLA** for the treating of all porous masonry surfaces, such as brick, concrete, light weight masonry units, stucco or cement plaster.



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3-Ton "Lightweight" 75 ft.  $\frac{34}{8}$ "  
5-Ton "General Utility" 250 ft.  $\frac{34}{8}$ "  
15-Ton Triple-Geared "Special" 1200 ft.  $\frac{34}{8}$ "

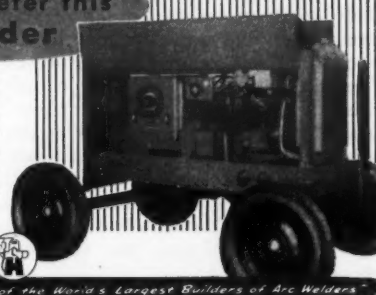
With patent gear change and positive internal brake that never fails, and will lock load.

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5-Ton 4 & 24 to 1	110 lb.	75
15-Ton 4, 18 & 109 to 1	680 lb.	250

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## Roadside Development And Public Relations

**How People of Your Organization Meet Individuals of the Public Largely Determines Whether Your Public Relations Will Be Good**

FORGET for a while that "the public" is a group. Stop concentrating solely on its group impression of your organization and work, on maintaining good group relations with it. For how often do you really come in contact with the public as a group? Aren't most of your contacts with this or that individual who is part of the group? Isn't it his impression, which he will invariably relay to his family, friends, associates, which ultimately swells into that group impression you are concerned about?

This is the emphasis in "Roadside Trees and Public Relations", a paper delivered at Ohio University's Fifth Annual Short Course in Roadside Development. Its author is Karl Dressel, Associate Professor of Forestry at Michigan State College, East Lansing, Mich.

### Public Judgement

Furthermore, Mr. Dressel reminds us, individuals do the creating as well as the receiving of impressions. And of all individuals in an organization, it is the office girl, clerk, and man on the job—rarely the supervisory personnel—who are in the front line of impression creating. This is as true of a highway department as it is of the store you may have entered yesterday, where the sales person and not the policy maker decided you never to "trade there again".

Like you in that store, John A. Public may have been antagonized by an office girl when he called at the highway department. John B. Public may have talked to a surly workman when he was watching a job. John C. Public, a passing motorist, may have seen the signs of a foreman's carelessness—sloppy clean-up work, or idle workmen "wasting the taxpayer's dollar". All three will judge the organization and its work on the basis of that firsthand experience, limited as it is, just as you did the store. All three will spread their antagonism or disapproval by talk,

casual though it may be, just as you blew off to your friends about "that impertinent salesgirl". Soon little local spots of ill will may have spread like eddies from a pebble dropped in still water. The result will be a bad group impression, what is called poor public relations, and scant interest in any of the highway department's work, such as roadside development—if not downright opposition to it.

### Building Good Public Relations

The steps to take are obvious, Mr. Dressel points out, though they are time and care-consuming. To begin with, it takes time and care to create good employee relations. It takes time and care to make an employee feel responsible, important. To tell him why a job has to be done, what it will look like when it's finished, how it will prove useful to others. To make him feel he can do his job just a little bit better than someone else, and give him reason to tell his wife, "When they want a lawn mowed, they always ask for me to do it". Even assuming an employee's good will, it takes more time and care to give him the facts about the organization and its aims so that his talk will be accurate. But if you don't take time to tell him these whys and wherefores, he may, with the best intentions in the world, unsell your work to the public.

But let us assume each employee's good will and accurate information, Mr. Dressel says. There is still something else you and he can do to create a favorable impression of your organization and its work on individuals of the public. You can realize that John A. B. or C. Public needs to be told your story in terms of his own interests and experiences. Like you, he has his own interests at heart and can best be sold on your interests if he is shown they are his too.

Your field men, for example, should be able to talk intelligently to John Farmer Public about his crops and animals; if they know something about his work, he'll feel confident they know their own. Should Adjoining Property Owner John value an old box elder that you feel must be removed, take his feelings into account. Concede its beauty and value, and when you tell him your views on its removal, do so in terms of his interests. Show him that it's apt to break easily and might cut off his telephone or electric light service. Tell him what you want to do with it and why, and be sure you include

among those whys the ones that concern him. That's the way you would want to be treated, Mr. Dressel reminds.

Remember that a newspaper editor, too, has his own interests to serve—that is, his readers' interests. When you want him to give your work publicity, let him in on your local plans. Let him help you put local color in the story, for

people always like to see their names and their friends' names in print. Don't try to keep a potentially unfavorable story, such as an accident, quiet and out of the papers. Give the editor the story yourself and see that he has all the facts; he will be fairer with you and with the story then.

(Concluded on next page)

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## Roadside Development And Public Relations

(Continued from preceding page)

### Conclusions

It is too bad, Mr. Dressel remarks, that our technical schools have in the past paid so little formal attention to the subject of public relations. All too often our graduates leave school wrapped up in the technical terms of their profession, with little awareness that they can do their work only by mingling with their fellow man. Surely it is the duty of teachers to explain public relations no less than the best way to do the job, Mr. Dressel contends, since our work in almost any field so often stands on our ability to tell it to our bosses and to the public.

"I think we have done a fine job in roadside development with the technical phases," he concludes, "but I also think we have failed in many cases to sell the show to the customers. If we

would devote one-tenth of our time to studying ways and means of selling our work to the public, many of our problems in public relations would disappear."

### Savings in Cement

In a booklet just issued by the Universal Atlas Cement Co., case histories of twelve construction projects are detailed. On each, the booklet says, a saving in days and dollars was effected by the use of Atlas high-early-strength portland cement. You can get this illustrated report from Universal Atlas at 135 E. 42nd St., New York 17, N. Y.

### Heads Beckwith Sales

Hugh A. Cameron has been named General Sales Manager by the Beckwith Machinery Co., equipment distributor in Wilkes-Barre, Pittsburgh, Harrisburg, and Bradford, Pa. He will make his headquarters in Pittsburgh.

## New Housing Seal For Roller Bearings

A new housing seal for roller bearings has been announced by the Shafer Bearing Corp. Known as the Z Seal, the new device has been especially designed to retain lubricant effectively and keep dirt out, Shafer says.

The seal element fits on an extension of the inner bearing race with a minimum running clearance, the manufacturer explains. Held under moderate tension, this element is permitted to float radially. The entire Z Seal is easily removed, and can be disassembled into its five components. Brass construction is used in two parts to prevent corrosion and to give natural bearing surface during momentary contacts with the inner race.

Z Seal is furnished as standard equipment on all Shafer roller-bearing units. You can secure a full description of it

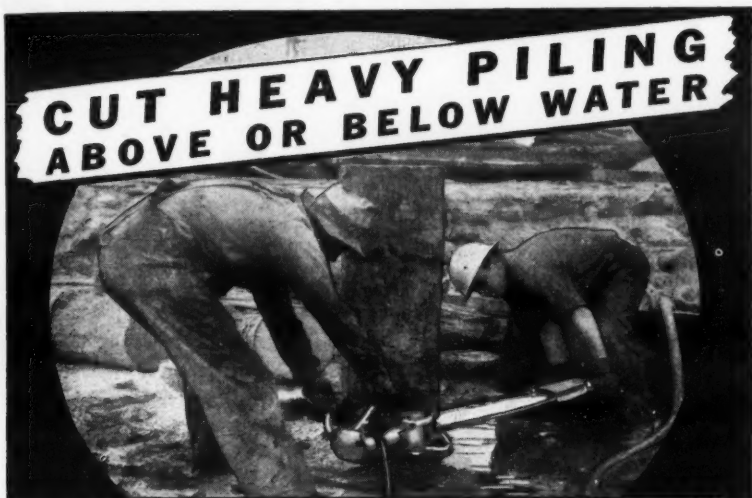
from the firm on mention of this notice. Write Shafer at 1412 W. Washington Blvd., Chicago 7, Ill.

### Plastic Flashlight

A tough new flashlight case, said to resist denting, has been put on the market by Ideal Industries, 1366 Park Ave., Sycamore, Ill. Made of shockproof plastic, it will not conduct electricity, and can be used in rain or extreme temperatures, Ideal says. The light has an unbreakable lens. The manufacturer will be glad to give you details.

### Guide Koppers Tar Sales

Vice President J. N. Forker will serve as General Manager of the new Tar Products Division of the Koppers Co. J. C. Macon, Jr., has been named General Manager of the Tar Sales Department, with offices at Pittsburgh.



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Gives full information, specifications, diagrams, etc., on McKiernan-Terry Double-Acting Pile Hammers and Extractors. Write for it today.

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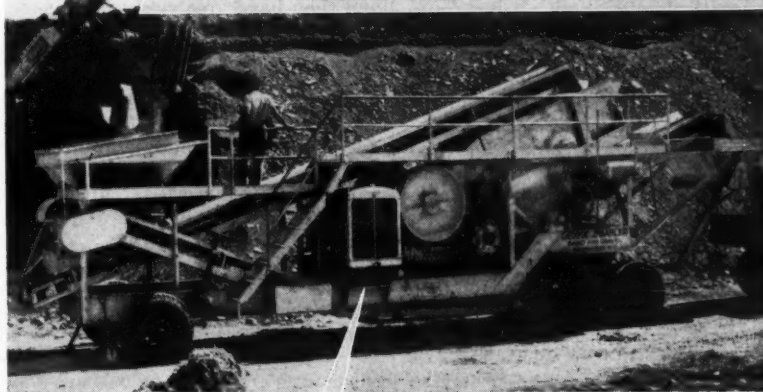
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## THIS CRUSHING PLANT IS *Self-Propelled* AND OPERATED BY A **WAUKESHA ENGINE**



● When you want to move this Lippmann dual crushing plant from one gravel pit to another, no truck or tractor is needed to tow it. It is *self-propelled*—by its Waukesha Engine.

The plant is entirely self-contained. Nothing to take down or set up. With its five speeds, four forward and one reverse, the plant's one man operator-driver can not only move it, but spot it right where he wants it, at any time.

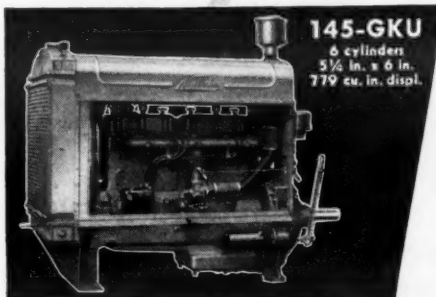
The gasoline-fueled Model 145-GKU Waukesha Engine develops 167 hp. @ 1800 rpm for road travel. It transports the 60,000 lb. plant easily and smoothly, stepping out as fast as 30 mph. at times.

This plant is equally remark-

able for capacity. It turns out a minimum of 60 yds. of minus 3/4" aggregate hourly; and has reached as high as 120 yds. in an hour. Again its Waukesha Engine contributes materially. At 1400 rpm it develops 145 hp.—to drive the plant's 12" x 36" jaw crusher, 30" x 20" roll crusher, 2-deck vibrating screen, reciprocating feeder, and three conveyors—efficiently and reliably. It takes no time out for shutdowns and, being a Waukesha, both power and engine maintenance costs are the lowest.

The plant is made by the Lippmann Engineering Works, Milwaukee, Wis. The enthusiastic owner of the one shown is George J. Bahler, Wauwatosa, Wis.

Most contractors and other users of power-machinery are enthusiastic when it's Waukesha-powered. There's a Waukesha for your every engine need—gas, gasoline or diesel fuel. Consult Waukesha engineers. Send for Bulletin 1225.



**145-GKU**  
6 cylinders  
5 1/2 in. x 6 in.  
779 cu. in. displ.

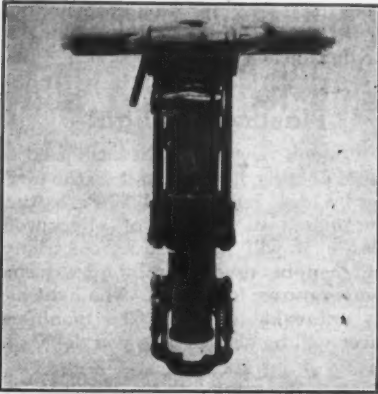
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Schramm's D-45 rock drill, with a new type of valve designed for fast, economical operation, takes  $\frac{3}{4}$  or 1-inch steel and uses 70 to 80-pound pressure.

### New Rock Drill Has Light, Fast Valve

A rock drill weighing 45 pounds has been added to the Schramm line of construction tools. The unit is operated by a new type of valve which is said to make the drill fast and economical in operation.

The D-45 drill is made of drop forgings throughout, and all parts are of special-analysis steel, heat-treated for their particular function. It has four-pawl construction and an offset handle. Air cushioning eliminates side rod springs. A built-in oil chamber near the top of the drill provides automatic lubrication to all working parts.

Exhaust ports are arranged to divert the fumes away from the operator, Schramm says. Also, they are of ample size to prevent freezing. The drill is furnished in either dry-blower or wet-blower type. It will take  $\frac{3}{4}$ -inch or 1-inch hexagonal-shank steels, and uses 70 to 80-pound pressure.

Schramm Inc. will be glad to send you a data sheet giving full details about the D-45 rock drill. Write the firm at West Chester, Pa.

### All-Weather Paving Mix

Eight working features are claimed for its Master Mixes in a brochure issued by the Kotal Co. The pavement mix is described as easy to use, stable, workable in all weathers, saving of time, labor and money. The manufacturer says it can be stockpiled for long periods.

The Kotal Co. will be glad to send readers of CONTRACTORS AND ENGINEERS

MONTHLY further details about this mix. Write to the company at 360-68 Springfield Ave., Summit, N. J.

### Precision-Machined All-Steel AC Motors

Users of electric induction motors will be interested in the epic of industrial endeavor that is behind the production of a new ac motor recently introduced by Westinghouse. The motor, known as the Life-Line, is scheduled to supersede all previous Westinghouse units in the 1 to 300-hp range.

New materials, new methods, new processes, and new tools were used by Westinghouse to develop the new motor. The firm even went to the extent of purchasing a complete new factory in a new location, staffing it with new personnel, and equipping it with tools specially designed and built for the job.

Motors in the Life-Line series are 35 per cent smaller than their predecessors, due to several factors—among them, the use of steel instead of the conventional cast iron. However, the motor's structural sections are as thick as they would be if made from cast iron, and they have greater shock resistance and ruggedness, Westinghouse says.

Higher operational efficiency is said to result from the use of steel, since it can be machined to much closer tolerances. Precision manufacturing produces smooth, quiet operation in the Life-Line. Vibration is cut to a minimum by pre-lubricated ball bearings that need no attention for at least five years.

Reduced size does not sacrifice any of the Life-Line's electrical properties, Westinghouse says. Starting torques have been increased as much as 134 per cent per pound of motor, and high efficiencies and power factors are maintained. New features in insulating materials and improved winding techniques are said to make for fewer burn-outs.

Because the new Westinghouse line is based on precision mass production, interchangeability of parts gives the user a wide range of combinations to select. All in all, over 30,000 different motor combinations are possible in the Life-Line series, the firm says.

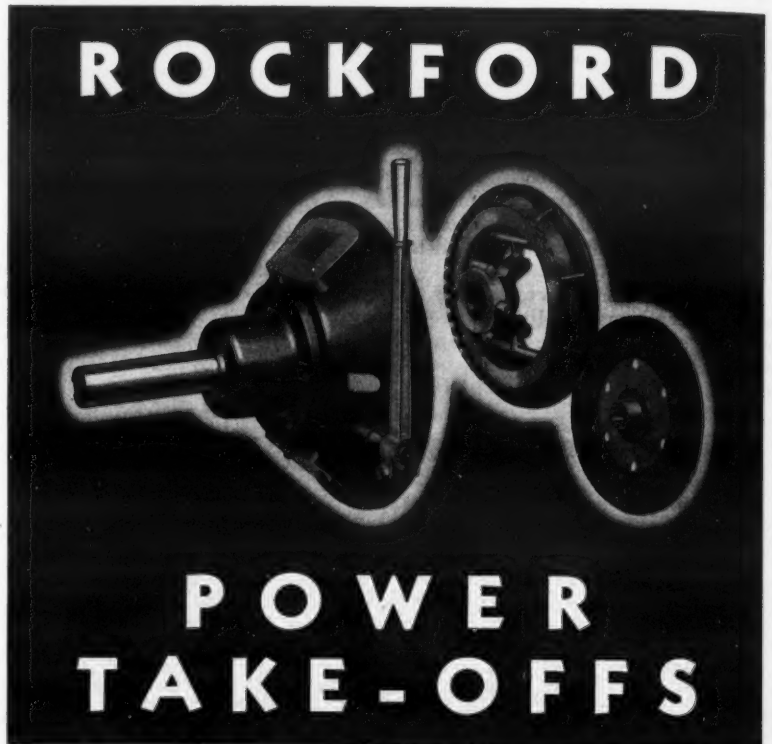
To get the full picture of this new type of motor and its many applications, write the Westinghouse Electric Corp.,

306 Fourth Ave., Pittsburgh 30, Pa. Tell the firm you read this notice.

### Has Insley Line in Ohio

The Conners Equipment Co., formed recently at Cleveland by J. T. "Jack" Conners, former Manager of the Coast-

al Equipment Co., has been named an Ohio distributor for Insley excavators and materials-handling equipment. The new firm will supply Insley machinery in 31 northern Ohio counties, while the Carr Equipment Co. of Columbus will continue to serve the firm in central and southern Ohio.



#### SELF CONTAINED UNIT

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#### ROLLER BEARINGS

#### FINE ADJUSTMENT

#### ACCURATE BALANCE

#### S.A.E. DIMENSIONS

\*ROCKFORD POWER TAKE-OFFS are equipped with roller bearings of ample proportions for carrying the loads to be placed upon the unit. The proportions of the bearings and shaft are determined by the load capacity of the clutch selected. ROCKFORD POWER TAKE-OFFS are designed for generous overload capacity.

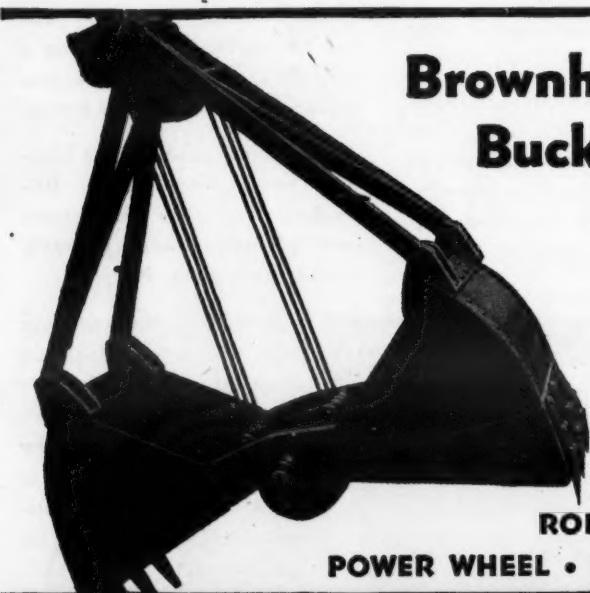
#### Send for This Handy Bulletin

Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.

### ROCKFORD CLUTCH DIVISION

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## NOTICE TO CONTRACTORS

Before the end of 1946, the Sewerage and Water Board of New Orleans, Louisiana, expects to call for bids for the construction of a water main consisting of the following:

- 14,350 lineal feet of 48-inch cast iron pipe, or of steel pipe of the same outside diameter.
- 9,400 lineal feet of 42-inch cast iron pipe, or of steel pipe of the same outside diameter.
- 11,650 lineal feet of 36-inch cast iron pipe, or of steel pipe of the same outside diameter.
- 6,100 lineal feet of 30-inch cast iron pipe, or of steel pipe of the same outside diameter.
- 4,650 lineal feet of 24-inch cast iron pipe.

Installation of the whole main, including the furnishing of the 24-inch cast iron pipe, will be under one contract. Cast iron pipe and/or steel pipe of 30-inch size and larger, and valves—both gate and check—will be purchased under separate contracts. . . . The installation of the water main will be in city streets, from the purification plant to the other side of the city; and, is to be completed within twelve months after the delivery of the pipe.

### BIDDERS MUST BE LICENSED UNDER LOUISIANA LAW

Since bidders on the installing contract are required to be licensed under Louisiana Law before they can be issued plans and specifications for making proposals, all contractors who may be interested in bidding on the above work are invited to communicate with the General Superintendent, Sewerage and Water Board of New Orleans, 526 Carondelet St., New Orleans 12, La., who will furnish full information as to the work to be done and the qualifications required of contractors.



## Soil-Cement Base

(Continued from page 1)

was hauled to these windrows and spread at the rate of 5 per cent by weight. This figured one sack every 2.7 feet per windrow. A gang of five men was used with a flat-bed truck for this work. The cement bags were laid out about two days ahead of mixing, but the bags were not opened and dumped until the strip was scheduled to be road-mixed.

A Model 54 Wood Roadmixer with a Neptune water meter and a Roper 2-inch water pump was then brought in behind a D8 Caterpillar tractor. The tractor was equipped with a special drive coupling and gears for turning the mixing gears in the Wood machine.

Windrows were picked up by the loading apron of the Wood Roadmixer as it traveled along, and about 10 per cent of water was added. The native soil, cement, and moisture were thoroughly mixed in a single pass, and laid out behind the machine in a windrow similar to the one ahead. Water was hauled from the Pasadena city supply by a 3,000-gallon tank truck. It was hooked by a hose to the Wood Roadmixer and traveled along with the machine while the soil was being mixed. Water was pumped and metered by the Wood Roadmixer.

A Caterpillar No. 12 motor grader then straddled this windrow and skimmed a slice of dirt out towards the curb line. When the Wood machine finished 600 feet, it was backed up to the point of beginning, and mixing proceeded on the second windrow. The



C. & E. M. Photo

Bags of portland cement for the road-mixed sub-base were laid out on the windrow ahead of the mixer. Traffic used the existing road while the new divided highway was built on either side. Later, this was ripped up to become the dividing island.

motor-grader operator finished his grade in about four passes behind the Wood Roadmixer. After both windrows were flattened, two men set grade stakes every 50 feet from a string line stretched from the dividing-strip curb to the outside curb. The grader operator then bladed the mixture to these neat blue-topped lines.

The mix was rolled by a 12-ton 3-wheel Buffalo-Springfield, followed by a Bros Wobble Wheel pneumatic-tire roller ballasted to 8,000 pounds. Rolling was done about an hour on each 600-foot traffic strip; the surface was kept moist from a sprinkler on a Ford tank truck. Compaction requirements on the sub-base were 95 per cent of laboratory optimum density. So to insure maximum compaction, every effort was made to shape and roll the road-mixed material with the least possible delay between the introduction of the water and the final rolling.

A sample taken from the street and compacted by laboratory method, at

periods of 30 minutes, 1 hour, 2 hours, and 3 hours after mixing, showed a comparative compaction as follows: using the 30-minute compaction as 100 per cent (actual relative compaction 94 per cent), 1 hour, 98.6 per cent; 2 hours, 97.7 per cent; and 3 hours, 97.3 per cent. The surface of the compacted strips

was then sealed with 0.16 gallon of 150 to 200-penetration asphalt emulsion, and allowed to cure.

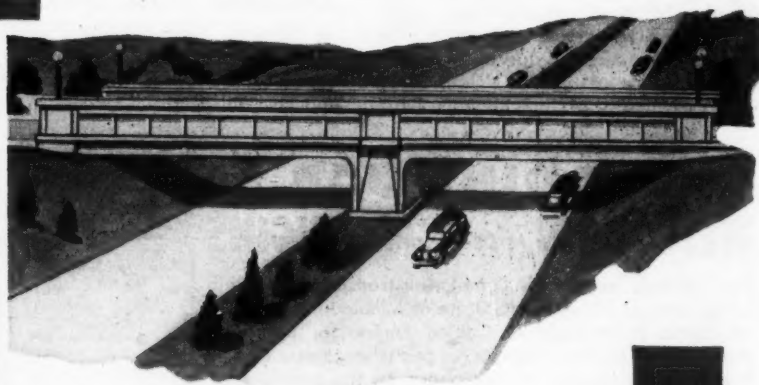
### Plant-Mixed Stabilized Course

For the next course, aggregates and cement were mixed in a Standard asphalt-plant pugmill. Some of the screens were removed to keep the mix from blocking. Cement at the rate of 5 per cent by weight was added here, with about the same rate of water as for base material. Mixed material was hauled to the job by a fleet of 8-yard GMC and Diamond T trucks.

The trucks dumped into the hopper of a Barber-Greene Tamping-Leveling Finisher, which handled the cemented aggregate in the same way it handles hot-mix. Two 10-foot strips and one 9-foot strip were laid by the finisher, with 3 feet being raked at one side. Breaks of from 1 to 2 per cent and from 2 to 5 per cent on the riding surface were handled by the Barber-Greene adjustable screeds. Resident Engineer

(Concluded on next page)

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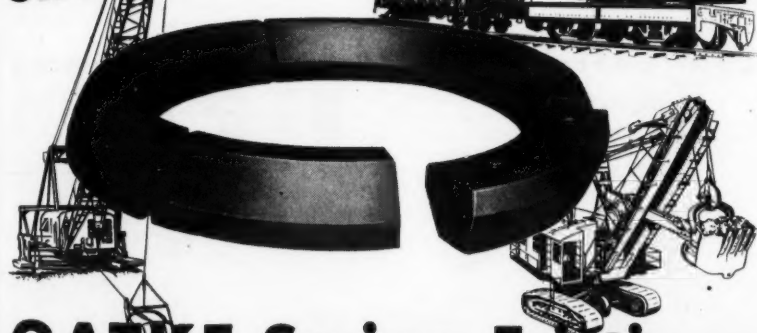
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## GATKE CORPORATION

232 N. La Salle St.,

Chicago 1, Ill



## Soil-Cement Base

(Continued from preceding page)

Montgomery estimated that this finisher developed about 60 per cent of the ultimate compaction of this material as it went along.

Finished strips were rolled by a 12-ton 3-wheel Buffalo-Springfield roller, followed by a pneumatic-tire roller towed by a Case tractor. The surface was sprinkled by the Ford water-tank truck. A tack coat of 0.16 gallon of emulsified asphalt was applied by spraying.

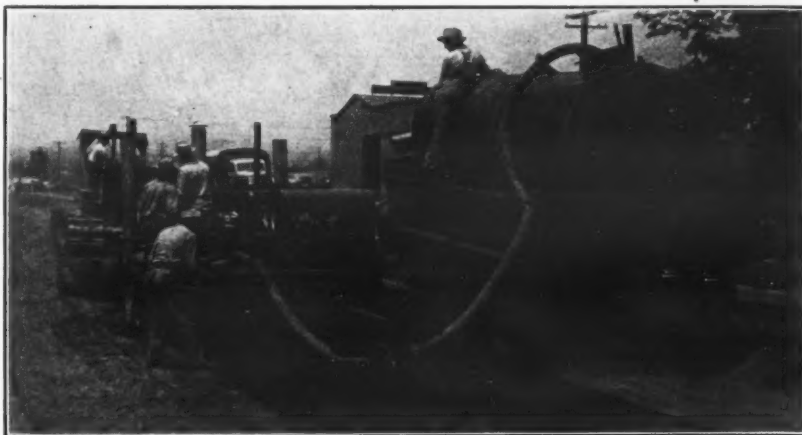
### Hot-Mix Surface

Hot-mix asphaltic concrete was laid in two 2-inch courses by the Barber-Greene finisher, and rolled by an 8-ton tandem and a 3-axle tandem Buffalo-Springfield. It was mixed at a central mixing plant 5 miles from the job. About 4.8 per cent of Gilmore MC-3 asphalt was used in the mix.

The laying of hot-mix had not begun when **CONTRACTORS AND ENGINEERS MONTHLY** Field Editor visited the job, but the contractor expected no difficulties after having lavished such care on the sub-base.

### Traffic-Island Landscaping

The 28-foot dividing strip was ripped up after traffic could be handled in the new outer lanes, and a pressure sprinkling system for landscaping was installed. Stripped topsoil was then hauled from the stockpile back to the dividing strip, where Kikuyu grass cuttings are to be planted at a later date on approximately 24-inch centers. This



C. & E. M. Photo  
A Wood Roadmixer thoroughly mixed the windrow of soil and cement in a single pass. Griffith Co. was the contractor for the construction of this new divided state highway in the Los Angeles Metropolitan district.

dense grass will eventually cover the strip, resulting in a naturally beautiful dividing island that will not distract a motorist's attention.

### Personnel

Russell Armstrong was the Superintendent on the job for Griffith Co. C. P. Montgomery was Resident Engineer for the State of California. S. V. Cortelyou is the District Engineer in District VII, where the job is located, and George T. McCoy is California State Highway Engineer. The job was started April 18, 1946, and finished in 120 days.

### Diamond Sales Personnel

A General Sales Manager and two assistants have been appointed by the Diamond Iron Works, Minneapolis, to supervise the firm's sale of rock and

for the crushing-equipment line. He will be aided by C. L. Vader, with the firm since 1942, and P. A. Giessel, recently returned from duty with the Army.

### Weight-Batching Plants

Accurate proportioning of aggregate materials in concrete production with the Weigh Batcher, a feature of Noble batching plants, is described in an 8-page folder devoted to the plants. Both manual and automatic weigh batchers are included in the line. The automatic cement batching achieved by these weigh batchers is said to save time as well as cement. The weigh-batcher unit is fabricated complete with scales and controls in place and connected; this makes for fast field erection, the bulletin explains. The unit is small enough for truck or rail shipment.

Write the Noble Co., 1860 7th St., Oakland 7, Calif., for the bulletin, and mention this story.

gravel-crushing machinery.

F. H. Jusenius, former head of export sales, is now General Sales Manager

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Will Save You Money and Time

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Write for illustrated Folder No. 8-45

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This 100 Bbls. capacity bulk materials transport, operating within the road laws of the State of Michigan, employs a Wisconsin Heavy-Duty Air-Cooled Engine for operating the spiral unloading conveyor, at a discharge rate of 5 to 7 barrels per minute. In this operation the engine must overcome a difficult initial starting load, due to cement packing at the conveyor.

This is just another typical construction service job that calls for rugged, heavy-duty serviceability from the power unit . . . supplied in generous measure by all Wisconsin Air-Cooled Engines within their respective power ratings (2 to 30 hp.).



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World's Largest Builders of Heavy-Duty Air-Cooled Engines

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**CONTRACTORS AND ENGINEERS MONTHLY**  
470 Fourth Avenue  
New York 16, N.Y.



# Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

## Validity of Supplemental Contract Modifications

A dragline-service company agreed with one McCall that if he would become surety on the company's bid and performance bonds given under a construction contract, the company would purchase from him all materials and rent from him all equipment required on the job. The company performed its part of the agreement, but McCall refused to execute a bond as surety until the company agreed to pay him 7 per cent of the contract proceeds.

In litigation involving adjustment of the parties' mutual accounts, the Texas Court of Civil Appeals at Galveston decided that the agreement to purchase materials and rent equipment from McCall was sufficiently definite, with respect to what was to be purchased and what was to be rented, to be enforceable. But the court decided that the agreement to share the profits of the contract was unenforceable because there was no legal consideration for that agreement. McCall had bound himself to sign the bond on the sole consideration that he required material and equipment be secured from him. The company had complied with its part of the original agreement, and there was no consideration for the promise to do more than it was obligated to do under that agreement. (McCall v. Texas Dragline Service Co., 188 S. W. 2d, 243.)

On the first point decided, the court applied a general rule, recognized by all courts, that a contract to buy or sell all articles that may be needed by the buyer in the course of a specific business or enterprise, for a limited period or for a particular project, is sufficiently definite as to the subject of sale to be legally enforceable. In the case at bar, as under ordinary construction contracts, the materials to be purchased and the equipment to be rented were identifiable merely by ascertaining what it needed and used in executing the contract.

On the other point, concerning the validity of the related agreement to share the profits of the construction project, the Texas court recognized that there is a somewhat vague boundary line between cases such as the one in point, where a supplemental agreement may be invalid as being clearly without any consideration, and other cases where there are equitable considerations to support a voluntarily modified agreement. (As an example of an equitable modification, see the case of Blair v. United States, 147 Fed. 2d, 840, 843, where the Government extended the time for performing a construction contract because of excessive and protracted rainfall. The validity of that agreement was not challenged.) The Texas court quoted from a decision of the Texas Supreme Court (Barreda v. Craig, Thompson & Jeffries, 222 S. W. 177) statements in line with reason-

ing of the Minnesota Supreme Court (King v. Duluth Railway Co., 61 Minn. 482, 63 N. W. 1105) and probably many other courts:

"While the general right of modification may exist while the contract is executory [remains unperformed] on both sides, and the circumstances are such as to warrant the inference that the parties acted voluntarily, we think the great weight of" court decisions, "as well as the better reasoning, supports the view that such modifications will not be enforced, where the situation of the parties at the time of the modification is such as to negative the inference of voluntary action by the party surrendering his vested rights. . . .

"Where the refusal to perform and the promise to pay extra compensation for performance of the contract are one transaction, and there are no exceptional circumstances making it equitable that an increased compensation should be demanded and paid, no amount of astute reasoning can change the plain fact that the party who refuses to perform, and thereby coerces a promise from the other party to the contract to pay him an increased compensation for doing that which he is legally bound to do, takes an unjustifiable advantage of the necessities of the other party. To hold, under such circumstances, that the party making the promise for extra compensation is presumed to have voluntarily elected to relinquish and abandon all of his rights under the original contract, and to substitute therefor a new and modified agreement, is to wholly disregard the natural inference to be drawn from the transaction, and invite parties to repudiate their contract obligations whenever they can gain thereby."

## Excavating Contractor Is Entitled to Extra Pay

In bidding on a job, a Federal-dam contractor relied upon the Government representative's statement that all necessary filling material could be obtained from a specified near-by borrow-pit area. The statement was based upon test pits dug to depths of 10 to 12 feet, excepting one 20 feet deep. The contractor soon struck rhyolite just below the depth of the test pits. That made it necessary to obtain more than half of the fill material from other areas farther from the construction site. The contracting officer and department head determined that the contractor had encountered unknown conditions of unusual nature. Under such circumstances, the United States Court of Claims decided that the contractor was entitled to extra pay. The court said there was no basis for assuming that the official determination of the presence of fill material was influenced by bad faith. (S. J. Groves & Sons Co. v. United States, 64 Fed. Supp. 472.)

## No Public Funds to Meet A Public-Contract Claim

There are two special points which a wary contractor will not fail to ascertain in contracting to do public work. (1) Does the power of the public authorities to award the contract depend, by local statute or constitutional provision, upon the existence or creation of a fund for payment of the contract price? (2) Does such a fund exist or has it been provided for in conformity to the statute or constitution?

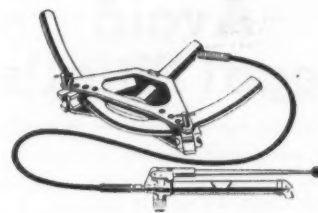
In a notable case, the Nebraska Supreme Court ruled that not even the state legislature could create such a fund. It could not constitutionally sanction use of money appropriated for expenses of one biennium to payment for road work constituting obligations of the preceding biennium. However, these obligations might be met by deficiency appropriation. (State v. Marsh, 196 N. W. 130.) The Supreme Court declared that the legal situation was not altered by the fact that the road projects were tied into Federal Aid. But the court did recognize that the claimants' contracts were not impaired by the state's diversion or depletion of the fund against which the claims were a proper charge, assuming that the fund was sufficient to cover the claims when the contracts were made. The court wound up by noting that the contracts were valid when made and had been honestly and fully performed. It recommended summoning the legislature in special session to make a deficiency appropriation. But since there was no currently available fund, the court had no power to order the state auditor to issue warrants on the claims.

## Contractor Not Entitled To Sublet Use of Highway

To what extent, if at all, may a highway contractor grant special permission for use of a road under construction? We find in the law reports an authoritative decision to the effect that ordinarily the contractor does not have such interest in the road as to be authorized to grant special privileges for its use. This is especially so where the contract contains a clause that deals specifically with use of the road by the general public.

Plaintiff was constructing a highway in Massachusetts, while defendants were building one across the line in Vermont. Plaintiff permitted defendants to haul stone over the Massachusetts road for use on the Vermont job. Defendants agreed to pay a tonnage charge for the haulage and to pay for any damage done to the road. Plaintiff sued to recover such charges and damages. The trial court dismissed the suit, and the Massachusetts Supreme Judicial Court upheld the decision. (New Haven Road Construction Co. v. Long, 168 N. E. 161.) The higher court concluded that it would be against public policy to permit a contractor to sublet, for his own profit, use of a road under construction. This conclusion was fortified by a clause in the plaintiff's construction contract: "The road will be closed to through traffic, but shall be kept open for local traffic. . . . The contractor shall so carry on the work that travel to and from abutting

(Concluded on next page)



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MANSFIELD, OHIO



## Avoid Legal Pitfalls

(Continued from preceding page)

property will not be obstructed". Said the Supreme Judicial Court, in part:

"By agreeing to permit the defendants to haul stones over a section of a highway into Vermont," plaintiff "violated the express term of its contract requiring that the road be closed to through traffic, and exceeded its authority. . . . The free use of all highways has been provided at the expense of the public treasury for many years in this commonwealth." Upon the facts it would be against public policy to permit the plaintiff to collect money from the defendants for their use of the highway as travelers. . . .

"The plaintiff contends that even if the part of the contract relating to a payment for the use of the highway is void, the remaining part relating to the payment for damage done by the defendants in going over the way should be upheld. . . . If it be assumed that there is evidence that such damage has been caused for which payment has not been made, the plaintiff cannot recover such damage under the contract. The damage was caused by a permissive use of the highway which the plaintiff was not authorized to grant.

"There was evidence that the hauling of the stone delayed the work, and this result might be assumed as almost inevitable without evidence, . . . especially when it appeared that damage to part of the road under construction had been caused and paid for. It is not in the public interest that public works should be delayed."

### War Did Not Warrant Canceling of Contracts

The Kansas Supreme Court affirmed a virtual dismissal of consolidated suits brought by highway contractors who sought to cancel contracts because performance of them had been impeded by war conditions. The court reached these conclusions: (1) A clause in the contracts required the contractors to comply with existing or later-enacted Federal laws, orders, and regulations. This clause therefore precluded complaint by the contractors concerning Federal priority orders, etc. (2) Contractors who voluntarily contracted with the Government for use of their equipment could not seek cancellation of their highway contracts on a theory that their equipment was requisitioned by the Government. (3) Nor could they seek it because some of their men had been drafted into military service. (4) Cancellation is not warranted on the theory that performance of the contracts has been delayed and become more burdensome due to war conditions. The contracts were entered into when war was imminent and they contained no provision excusing performance on that ground. (Freeto v. State Highway Commission, 166 Pac. 2d 728.) The court

also noted (p. 762) that state and national contractors' associations recognized the war risks in 1939 and made futile efforts to have exempting clauses inserted in construction contracts.

### Subcontractor's Neglect; General Contractor Liable

A general contractor engaged trucks and drivers from its subcontractors, supplementing its own trucks and one hired without a driver, to haul construction material. The last mentioned truck was damaged through collision with a truck operated by a subcontractor, and the owner sued the general contractor for the resulting loss. The accident occurred on a narrow private roadway, which had been built by the general contractor for use of those working on the job. It resulted from the uncontrolled manner in which trucks were driven in opposite directions on the narrow roadway.

The general contractor denied liability under the well established general rule of law that one is not liable to a third person for negligence of an independent contractor engaged by him. But the California District Court of Appeal, First District, said that the case was governed by an exception to the general rule, as summarized by a standard legal authority. The exception applies "when a principal contractor entrusts a part of the work to subcontractors but himself, or through a foreman, *superintends the entire job*. In such a situation, the principal contractor is subject to liability if he fails to prevent the subcontractors from doing even the details of their work in a way unreasonably dangerous to others, if he knows, or by the exercise of reasonable care should know, that the subcontractors' work is being so done, and has the opportunity to prevent it by *exercising the power of control which he has retained in himself*."

"The jury could well have found from the evidence in this case," added the court, "that the defendants, as general contractor, had built these private roadways for use in the performance of the contract; that they remained in general possession and control of them under the principal contract for that purpose; that their foremen were at all times present in general supervision of the work; that these foremen knew that the subcontractors were customarily operating their trucks over these private roadways in a manner likely to produce collisions between trucks; and that defendants failed to exercise their general control of the private roadways to direct the traffic in such fashion as to prevent such dangerous practices."

Accordingly, the Court of Appeal decided that the trial judge erred in ruling that the general contractor was immune from liability.

In passing, it would seem that under the reasoning of the court, a highway contractor might be liable for negligence of a subcontractor under similar circumstances on a section of public road in course of construction or repair. We do not read the decision as giving controlling effect to the fact that the accident occurred upon a private roadway constructed by the general contractor, but rather to the fact that they were in control of the use of the section of road involved. (LaMalfa v. Piombo Bros., 161 Pac. 2d, 964.)

### Labor-Supply Clauses In Federal Contracts

A Federal construction project required that preference be given by the contractor to persons on the relief rolls, in employing help. This clause, however, did not imply a warranty by the Government that any particular volume of labor would be available to the contractor, according to the decision rendered by the United States Court of Claims in the case of E. J. Albrecht Co. v. United States, 63 Fed. Supp. 85. Therefore, when there proved to be an insufficient supply of relief labor and the contract was modified to permit employment of other labor, the contractor was not entitled to hold the Government liable for the additional cost of securing other labor.



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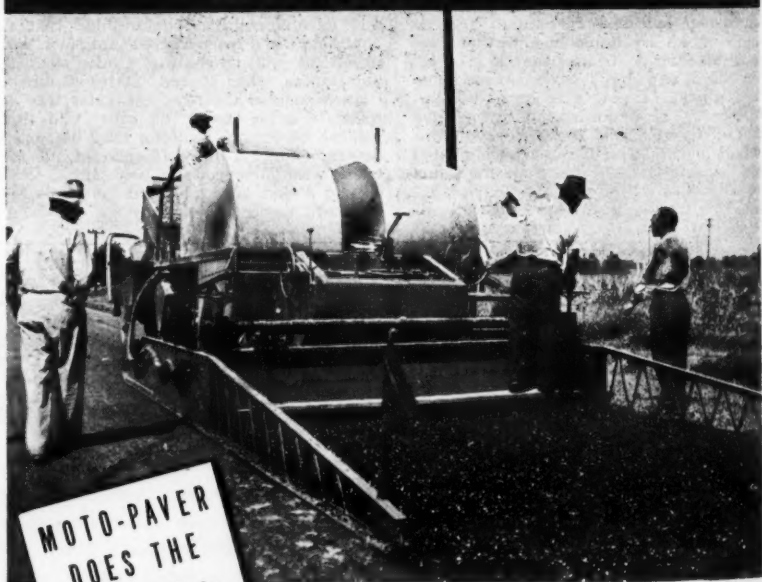
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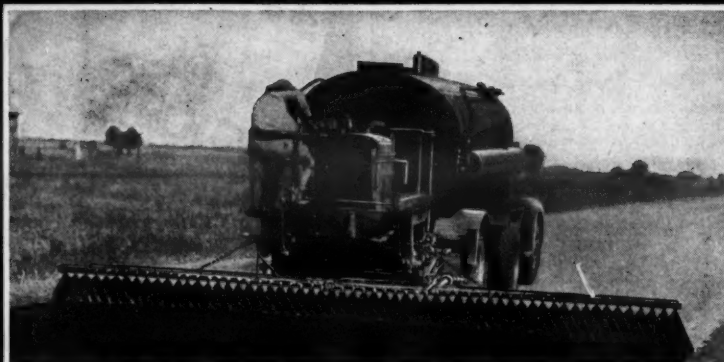
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"I've just been invited out to dinner."

## GMC Dust Fighters Aid Diesel Assembly

Particles of dust and other foreign substances can easily ruin the close tolerances necessary for the best performance in diesel engines, the Detroit Diesel Engine Division of General Motors says, reporting that the firm's anti-dust precautions have been revised.

Detroit Diesel has long used vacuum cleaners to suck away the dust that results from normal manufacturing operations. However, studies showed that even this was not enough to keep the engine parts absolutely clean for assembly, and the firm's Dust Laboratory was put to work on the project.

As a result of these studies, huge fans were installed in the areas near milling and boring machines. They draw away the fine particles, keeping them out of the air; heavier chips fall at the base of the machines, where they do no harm.

Having thus eliminated much of the dust, Detroit Diesel then devoted full attention to more thorough washing of engine parts. Dunking them in an open vat and drying them with streams of compressed air had long been the practice. It was found, however, that even though dunking loosened much of the dirt, quite a bit was apt to remain since the piece being washed was not turned over in the operation to allow dirt to spill out. This was particularly true in the case of engine heads and blocks, which have recesses where dirt can hide unnoticed. The manual drying system also made it easy to miss a spot with the compressed air.

Detroit Diesel now uses three automatic washing machines, one for heads, another for blocks, and a third for the smaller and less complicated parts of the diesel engine. Three stages of washing are undergone in the new washer. Held on an endless chain, the heads are bathed in a solution that dissolves oil and grease. A revolving rotor throws the cleaning liquid at them by centrifugal force. Similar action takes place in the second stage of washing, except that clear hot water is used instead of grease solvent. The water has a small amount of inhibitor added to prevent rust. Air blow-off at the end

of the washer dries the cleaned cylinder heads. Throughout the process, the heads are turning constantly, revolving 32 times in all, so that the cleansers and air reach all nooks and crannies.

The blocks go through a similar process, traveling on conveyor cradles. Instead of turning, they are inclined from side to side, however. Smaller parts are washed on conveyor hooks, the parts being so placed and slanted as to come into full contact with the water and air.

## Improved Electrode

A new improved electrode for work involving poor fit-up on mild steel has been announced by the Wilson Welder & Metals Co. The rod, No. 107, is recommended for single or multiple-pass welding on rusty or dirty plates or sections.

The 107 is a low-cost electrode that is said to embrace excellent arc characteristics, whether used with dc straight or reversed polarity or ac. It has a high deposition rate and permits use of the "dragging technique", Wilson says.

Additional information on the new electrode, No. 107, can be obtained from the Wilson Welder & Metals Co. on mention of this notice. The firm is located at 60 E. 42nd St., New York 17, N. Y.

## Tractor-Mounted Loader

Turning the tractor is unnecessary when loading a truck with the Athey ML4 MobiLoader, featured in an 8-page catalog issued by the Athey Products Corp. The hydraulically operated loader mounts on the Caterpillar D4 tractor. It digs, carries, discharges, and returns, all in a straight-line operating cycle.

The catalog, Form A-605, can be secured on mention of this notice. Write the Athey Products Corp., 5631 W. 65th St., Chicago 38, Ill.

## Small Gasoline Hoists

The rugged simplicity of its Frame 3 gasoline hoist is stressed in a catalog leaflet issued by the Clyde Iron Works to describe its convertible one and two-drum models, each built in two sizes. You can secure this leaflet by writing Clyde Iron Works, Duluth 1, Minn.

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▼ Shown below are Winkelman's 2 other Tournapulls currently working on a 500,000-yard section of 6-lane New York-Buffalo Parkway. Here, these rigs strip and stockpile sandy loam to be used later as topsoil between roadways. Tournapulls' ability to profitably handle all types of jobs, all kinds of materials, all haul lengths, insures future earnings.

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